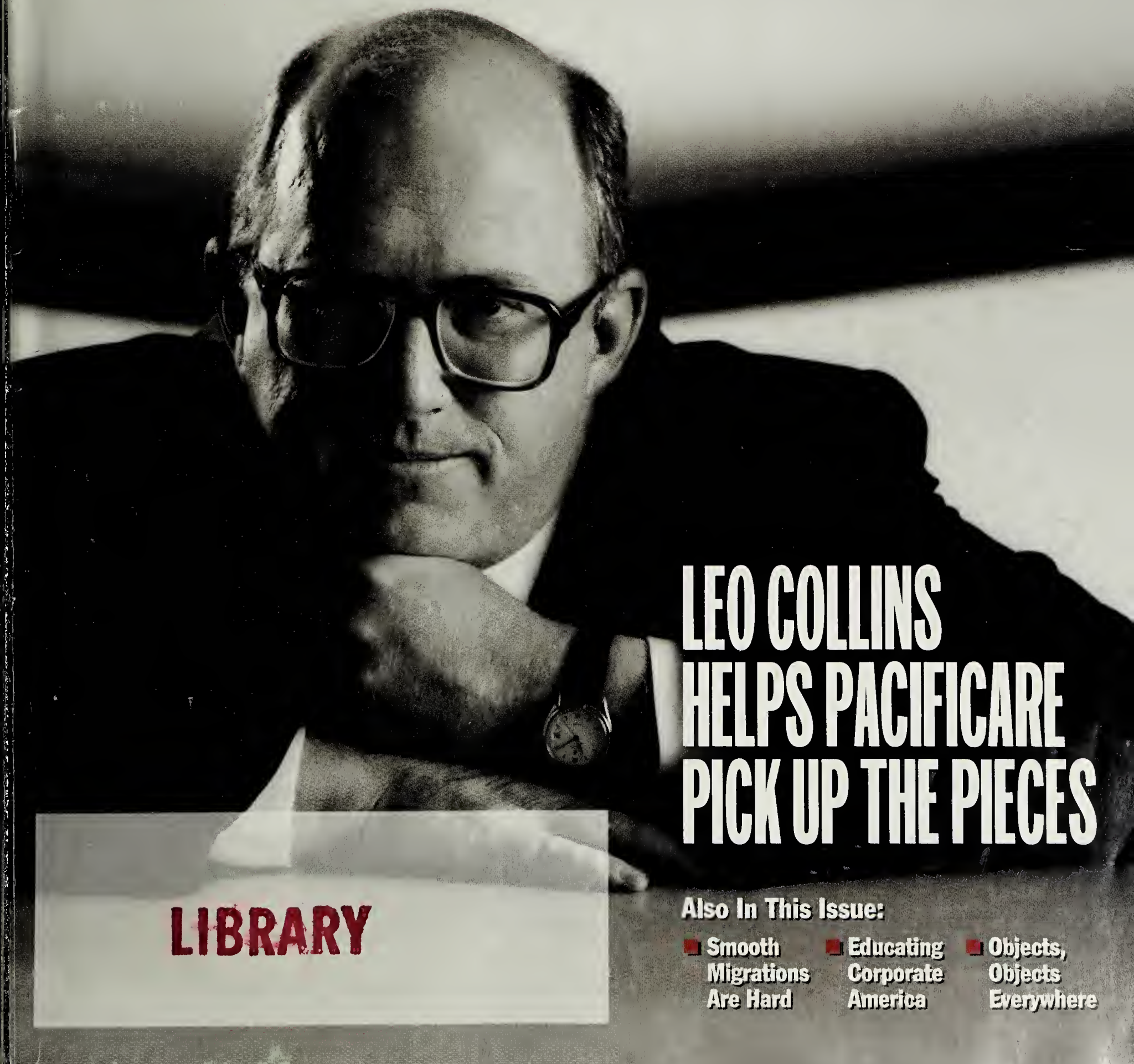
COMPUTERWORLD

MAY 1994

CLIENT/SERVER JOURNAL



LEO COLLINS HELPS PACIFICARE PICK UP THE PIECES

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- Smooth Migrations Are Hard
- Educating Corporate America
- Objects, Objects Everywhere

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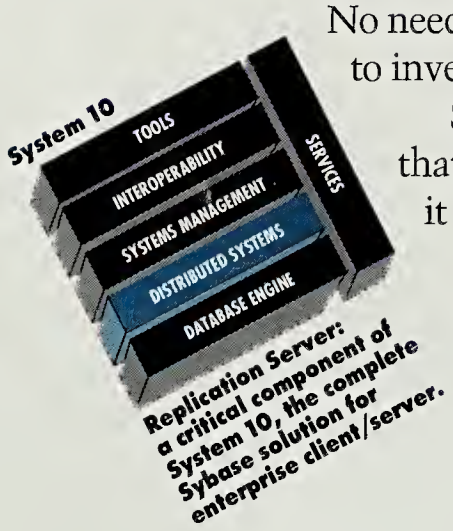

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COVER STORY

42 PacifiCare Picks Up The Pieces

Trying to make client/server work has been a rude shock for IS and business executives at this $2.2 billion HMO. Cost and schedule overruns, not to mention technology shortcomings, have conspired to make the transition extremely painful. PacifiCare, however, has persevered. Its first client/server applications went live last month. And while the HMO intends to proceed cautiously, it's not giving up on client/server. *By Kim S. Nash*

Helping customers out — **55**

MORE

COVER PHOTOGRAPHY BY ALAN LEVENSON
THIS PAGE: PHOTOGRAPHY BY ALAN LEVENSON; ILLUSTRATION BY SCOTT MENCHIN

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Gain sharing trend in outsourcing — **75**

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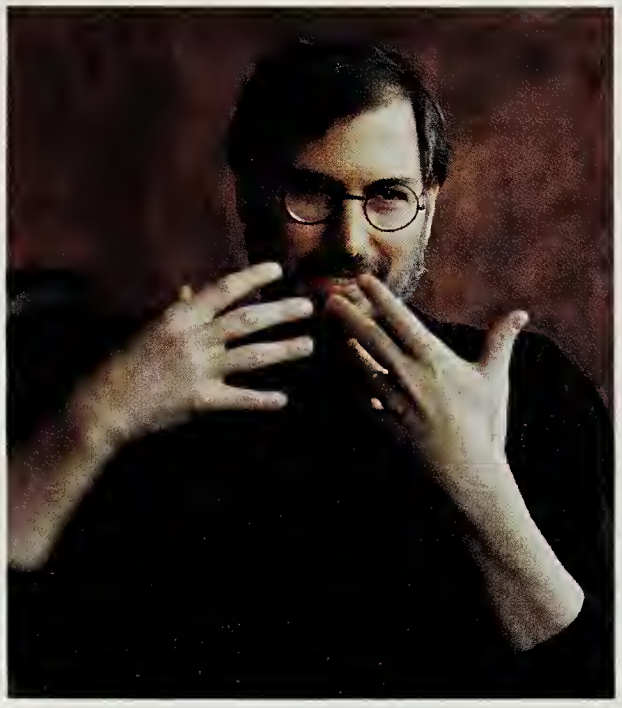
Objects should enable developers to build client/server applications that map more tightly with business objectives. That's easier said than done, but there are ways to determine which object-oriented method is right for you. *By Charles Babcock*

62 Banking On Objects

Despite the confusion, two leading financial institutions are experiencing productivity gains from systems built with object-oriented tools. *By Sally Cusack*



68 What's Next From Steve Jobs

Conceding the mistakes and shortcomings of his proprietary Next workstation, Steve Jobs is now betting heavily on objects. The client/server revolution has stalled, according to Jobs, because robust tools that would enable developers to build better systems more quickly and less painfully are still unavailable. To the rescue: Next's NextStep object-oriented development environment and a relationship with Sun. *By Maryfran Johnson*

ALSO IN THIS ISSUE

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Determining outsourcing prices no longer means counting mainframe cycles but sharing risks — and rewards. *By Mark Halper*

81 The Changing Face Of Software Licensing

Tiered software licensing is going the way of leaded gasoline. Client/server devotees want flexible terms and conditions that more accurately reflect how software is used and how client/server networks evolve. *By Alan Alper*

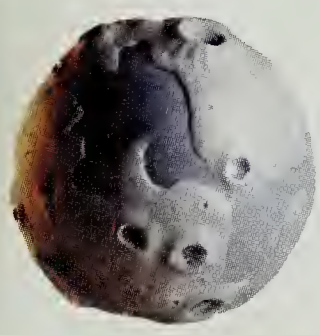
86 Managing The Storage Mess

Client/server's advent means that critical data, in many cases, is scattered all over the enterprise with few — if any — controls. Many corporations are just now backing up server data in a coherent manner. *By Johanna Ambrosio and Stephen P. Klett Jr.*

92 Heading Off Server Constraints

Many IS shops are finding that server retrieval efficiency has more to do with network and software tuning than with server hardware. *By Cheryl Gerber*

PHOTOGRAPHY BY DAVID POWERS; ILLUSTRATION BY DAVID CLARK



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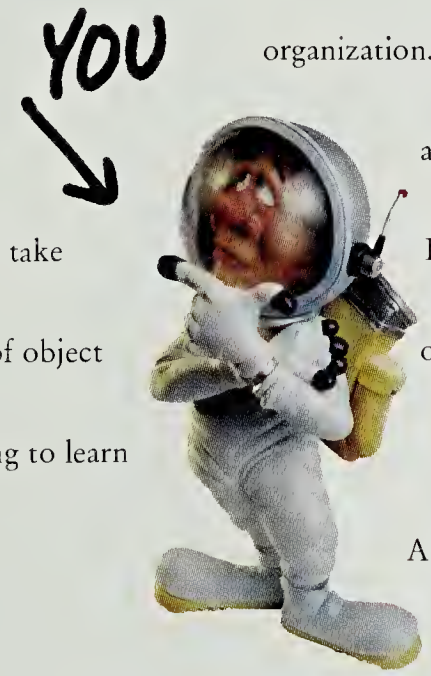

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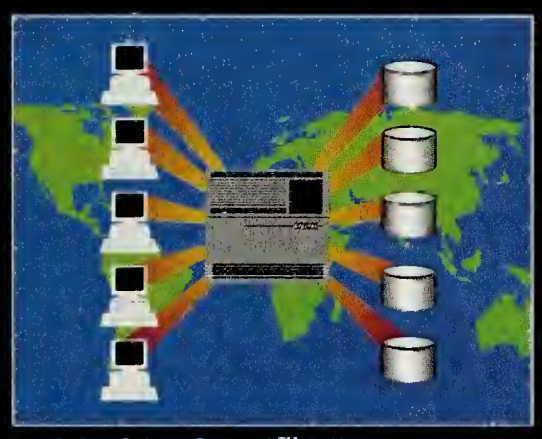

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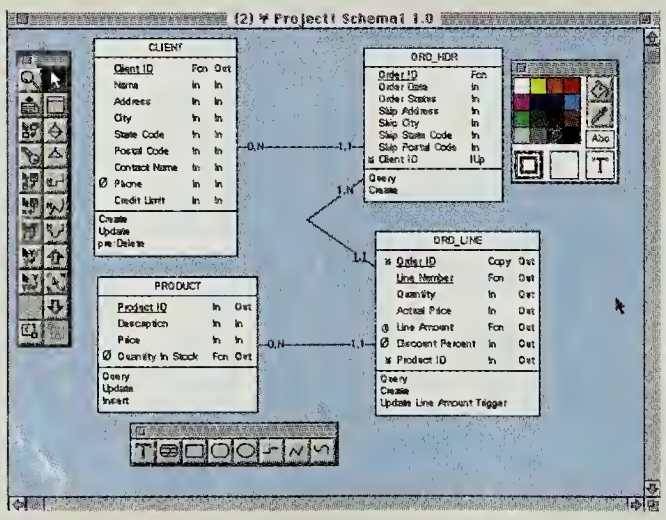

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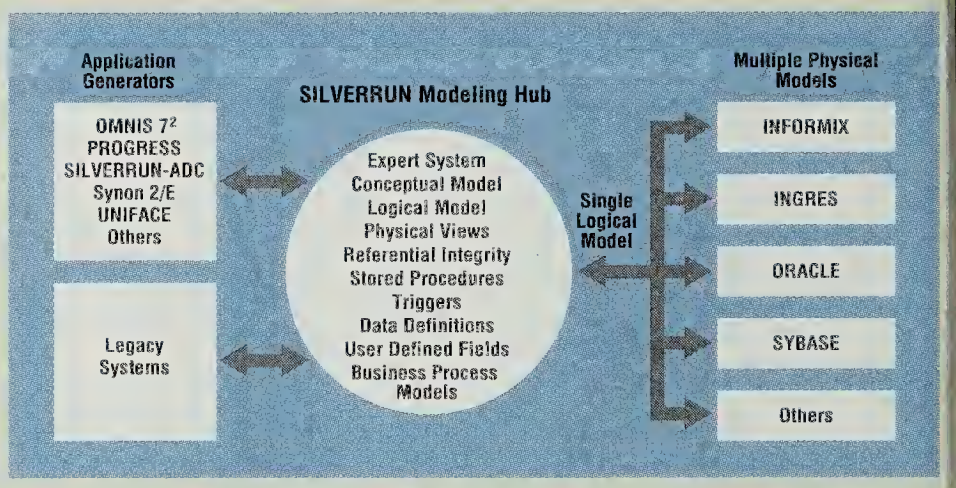

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PHOTOGRAPHY BY STEPHEN SHERMAN

EDITOR'S NOTE

Alan Alper

If you are basing cost justification primarily on lower-cost processors, packaged software and turnkey networks, think again.

Sizing up the financial benefits of client/server is like trying to measure a small child. As with a squirming, wriggling, kinetic kid, client/server is difficult to get your arms around.

Witness some shops' constantly changing network topology requirements. Take a look at the never-ending array of sophisticated software and ever more powerful hardware, which get glommed onto client/server environments. These pricey additions make cost-justifying client/server extremely tricky.

One need look no further than the exclusive *Client/Server Journal* survey of 137 users for evidence of the cost-justification conundrum (see page 72). Some 61% of those surveyed said they were convinced client/server is paying off. Yet 49% of those receiving a return on their investment said they were unsure how much money they were saving.

Respondents most often cited better access to data and improved systems performance as the key benefits of client/server. Those that hadn't noticed client/server's paybacks said it was too early to tell.

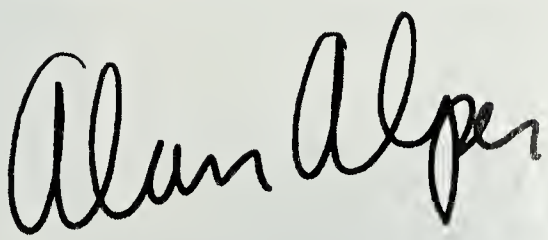
As you page through this issue of *Client/Server Journal*, you'll see that many users are in the same bind. Read our cover story on PacifiCare's rocky baptism into client/server (see page 42). The HMO's inaugural client/server system recently went live after two years of serious cost overruns, schedule slippages and technology shortcomings. PacifiCare's treacherous trek to client/server, however, was mandatory because existing VAXclusters were running out of steam. And yet, when all is said and done, PacifiCare isn't sure if client/server will pay off for another two or three years.

A story on client/server migration has a Gartner Group sourced chart ("Getting from Here to There," page 20) showing that while many firms are moving applications off mainframes onto PC networks, they are transferring only a small portion of their programs at a time. That leaves a majority of costly, big-iron production systems intact, meaning minimal cost savings — at least initially.

The Stamford, Conn., researcher also suggests that over five years, it will cost $1 million to operate a small client/server environment consisting of one server and 20 clients, $13.3 million for a medium-size setup of 200 clients and five servers and $241.8 million for a large network of 5,000 clients and 250 servers.

Not so surprisingly, labor — spanning application development, end-user support and end-user operations — constitutes the largest slice of the cost-of-ownership pie. It ranges from 64% in a large environment to 77% in a medium-size network. So if you are basing cost justification primarily on lower-cost processors, packaged software and turnkey networks, think again.

Remember, like the small child you tried to measure, client/server networks will grow and grow. But you need to make sure that your architecture — like your sprouting child — doesn't eat you out of house and home! ◩



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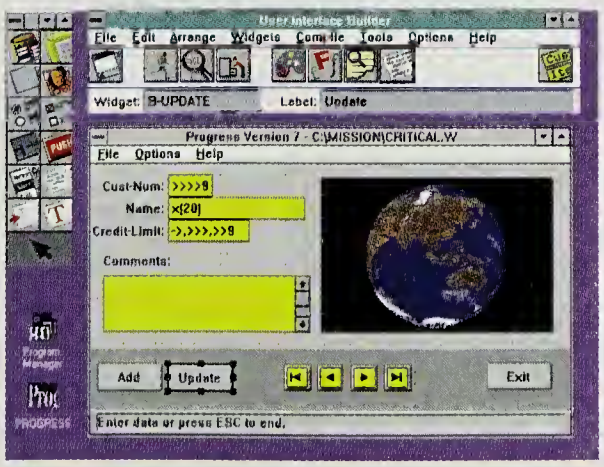

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INSIGHTS

A QUARTERLY REVIEW OF CLIENT/SERVER VIEWS AND EVENTS

SNIPPETS

■ If you're thinking of client/server, beware of trying to "achieve" a prescribed vision just for the sake of the technology, warns Andersen Consulting's Chuck Dean in his report entitled "Management Issues of a Successful Client/Server Implementation." While client/server has much to offer, making the transition can lead to unanticipated changes in office culture. Be careful to evaluate your needs against the benefits and "let the vision evolve."

■ Connecticut Mutual Life Insurance's Jan Cites recently told an audience at the Client/Server User Conference in New York how even the most precise planning can't predict client/server's impact. Cites estimated that his company's client/server move will bring an already 20% staff reduction to nearly 50% and that 60% productivity gains are jumping close to 100%. "The work," he said, "will be simply gone — done by technology."

■ Alternative Computer Technology and Sophos PLC recently released client/server virus detection software that automates the scanning process. Each time a user opens a new, previously unscanned file, the Intercheck software downloads the file to the server. There it is checked for viruses, "fingerprinted" and added to an archived list that lets the software know the file is clean. By scanning only new files and tracking them once they are given a clean bill of health, Intercheck eliminates the need for files to be rechecked every time they are opened. Intercheck is currently available for Novell servers and will be ready for VMS, OS/2 and DOS by midsummer.

Client/server makes the grade at Bradley U.

BRADLEY'S JOEL HARTMAN had client/server faith fed by success

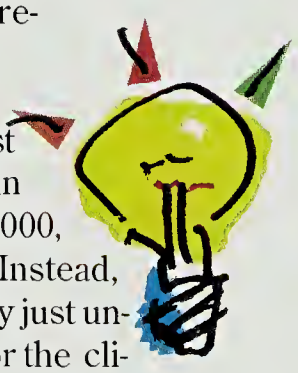
After four years of prepping, Bradley University is graduating to client/server. The Peoria, Ill., university recently rolled out a client/server network that handles its fund-raising, alumni and telemarketing data.

The project was so successful that the university plans to move the rest of its financial and administrative data to four Novell, Inc. networked servers by 1996, according to Joel Hartman, Bradley's associate provost for information technologies.

The university has spent the last few years creating a client/server network that provides access from university-issued PCs residing in 760 rooms in six residence halls to eight servers containing all of the campus computing resources including the Internet, electronic mail and the CD-ROM network.

More than three-quarters of the 766 respondents to a Datapro survey are evaluating, piloting or preparing to implement client/server systems.

While the success of the Resident Hall of the Future project helped foster Hartman's faith in client/server, it was the big cost savings the architecture promised that spurred Bradley to expand the network to run its financial and administrative applications rather than upgrade the mainframe on which they currently reside.



An upgrade would have cost the institution in excess of $900,000, Hartman said. Instead, Bradley will pay just under $400,000 for the client/server conversion, including training.

And when the migration is complete, Hartman said he is going to pull the plug on the old machine, no questions asked. He's that confident. ◩

Written by Erin Callaway, Computerworld's assistant researcher, Resource Center.

PHOTOGRAPHY BY ROARK JOHNSON

CLIENT/SERVER's TOP 10

Systems management has replaced tools as the No. 1 barrier to client/server implementation, according to users at the 1994 Uniforum Technology Managers' Conference. The conference was sponsored by Hurwitz Consulting Group, Inc.

1994's TOP 10

1. Systems management
2. Management of change
3. Cost justification
4. Tools
5. Training
6. Integration
7. Standards
8. Security
9. Management of the process
10. Immaturity/Unreliability of technology/infrastructure

1993's TOP 10

1. Tools
2. Skills and retraining
3. Methodology for defining architecture and application design
4. Cost justification and budgeting
5. Systems and network management
6. Legacy systems integration
7. Team work, user involvement and communications
8. Multivendor support and compliance to standards
9. Security
10. Rapid application development and prototyping tools

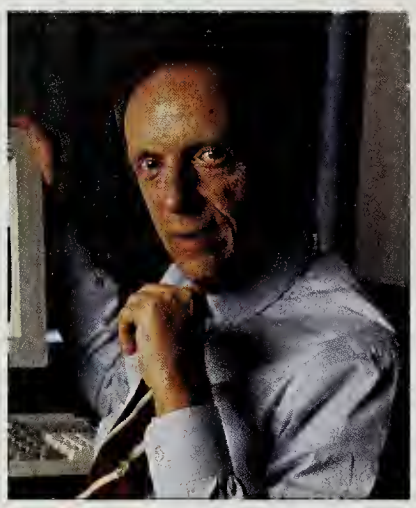
Dodge Country?

A defiant Frank Dodge declared he's not late with the general ledger client/server application he finally delivered last month, after promising it for three years and rearchitecting it in 1993.

While Dodge dithered, deep-pocketed competitors such as PeopleSoft, Inc., Oracle Corp., SAP America, Inc. and Dun & Bradstreet Software (the merger of his old company, McCormack & Dodge, with Management Science America, Inc.) established significant beachheads.

"Our position is that we're way ahead of everyone," he opined.

But The Dodge Group faces a steep uphill climb. "I think it's going to be very tough at this point, since everyone else has had a chance to get a product out there and refine it a little bit," said Heidi Dix, an analyst at Forrester Research, Inc. in Cambridge Mass.



FRANK DODGE acknowledges that he's lost face with some customers

Dodge is betting that large, multinational firms processing multiple thousands of entries daily would spend $250,000 for a fully loaded package to experience a performance difference. "We're running volumes on our software faster than they performed on the mainframe," he said.

The general ledger software, which runs on a Unix server connected to Windows clients, is the opening sonnet in a suite called OpenSeries, which will include accounts receivable modules.

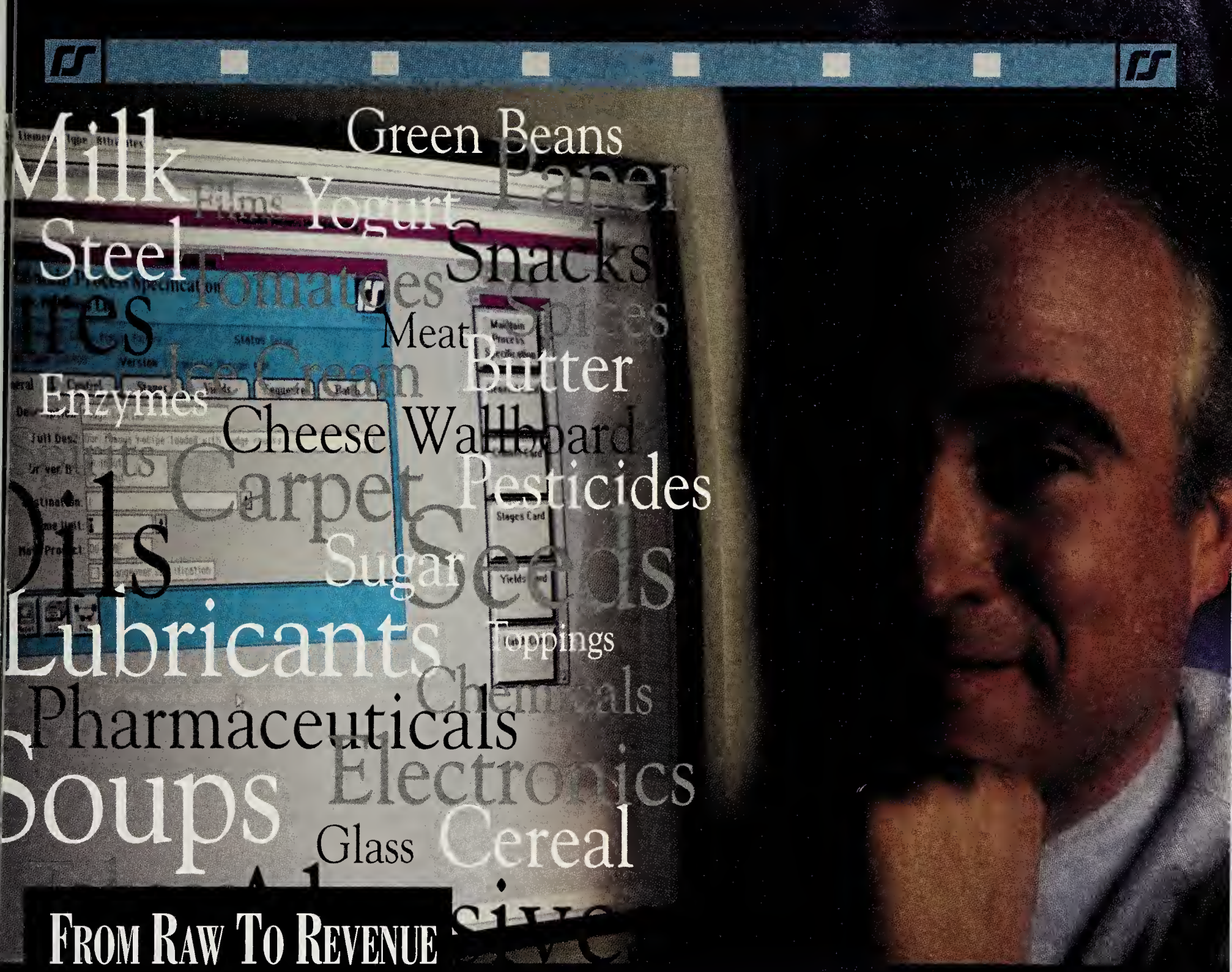
So far, Dodge has five paying customers, including Sun Life Assurance Company of Canada, Charles Schwab & Co. and The Bank of Paris.

Dodge realizes he's lost face with some customers but believes the market is large — and forgiving.

However, Dix said, "I think [credibility] is an issue; you can only keep customers waiting so long." ◩

Written by Alan Alper, editor of the Client/Server Journal.

The 5th Wave



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Technology

Beyond RDBMS: PostRelational

Relational database management systems (RDBMS), once hailed as the culmination of database technology, don't always meet today's real world needs. In the search for business solutions, users want performance, customization, flexibility, portability, and efficiency, all in an open, client/server environment. An emerging technology, PostRelational database management systems, may be the solution for many of these users.

- Equifax, the nationwide credit reporting service, supports nearly 775 users on a Hewlett-Packard system using a PostRelational database management system. If the Atlanta-based firm had chosen a traditional RDBMS system, the company estimated it would have installed a new server for each 150 new users.
- Parceline, the next-day parcel delivery service company based in the United Kingdom, chose a PostRelational DBMS for its ease-of-use features. An immediate success with users, VMARK Software's PostRelational uniVerse product provided an added benefit — software costs were reduced by half in the company's distributed UNIX environment!
- Air Ontario, which originates more than 150 flights a day, deploys leading-edge technology to stay competitive in the hotly contested airline business. With the help of uniVerse, the Canadian airline downsized its computer system by migrating to a UNIX and Novell PC local-area network with expected savings of $500,000 in maintenance and capital expenditures over five years.

These organizations and hundreds like them face the task of finding effective and efficient solutions in an atmosphere clouded by spiraling costs, expanding information needs, and increased competition. Each of these companies first looked at traditional RDBMS technology, but after closely examining their own business and user needs, decided on a more advanced choice, a PostRelational database system.

PostRelational Technology

What is PostRelational technology? PostRelational database management systems combine features of traditional RDBMSs with additional storage, manipulation, and data retrieval features required by many business users. PostRelational technology offers a more efficient infrastructure for certain types of applications, such as analytical applications which handle large pieces of information. Due to its efficiencies and the fact it is less resource-intensive, PostRelational technology enables users to utilize less expensive hardware, or put more users on a system. And larger numbers of users sharing a system means achieving substantially higher performance at a lower cost.

According to John Morrell, research manager at International Data Corp (IDC), a research firm, "the difference between a relational and a PostRelational database is in how information is stored and indexed — everything else is the same."

Organizations automatically turn to relational databases without really examining the efficiencies they might gain elsewhere, says Morrell. "This can be especially true in client/server environments in which users are just beginning to sort through the issues. Once that analysis begins, many organizations will realize that PostRelational technology may better help them manage the large amounts of quickly changing information necessary to their business," Morrell predicts.

Relational databases are very operation-intensive because they operate like a large flat file to find and retrieve information. This is no problem in transaction applications, but RDBMSs must create temporary holding places or "joins" for analytical applications, which are very overhead-intensive.

VMARK's uniVerse, for instance, eliminates this overhead because its three-dimensional database structure relies on a dictionary-based file system, enabling developers to create data dictionaries that

THE WORLDWIDE UNIX RELATIONAL DATABASE ENGINE/SERVER SOFTWARE MARKET, 1992 AND 1993
(all figures, software licensing revenues, $M)

	1992		1993		
	Licensing Revenue	Market Share	Licensing Revenue	Market Share	'92-'93 Growth
Oracle	305.0	43.9%	405.0	44.0%	32.8%
Sybase	93.0	13.4%	151.0	16.4%	62.4%
Informix	101.0	14.5%	125.0	13.6%	23.8%
Ingres	70.0	10.1%	73.0	7.9%	4.3%
Progress	20.0	2.9%	26.0	2.8%	30.0%
VMARK	14.0	2.0%	23.5	2.6%	67.9%
Unify	15.0	2.2%	15.0	1.6%	0.0%
Others	77.0	11.0%	101.5	11.1%	31.8%
Total	695.0	100.0%	920.0	100.0%	32.4%

Database Engine/Server software includes database server and connectivity products, and specifically excludes development tools and service revenues

Source: Preliminary IDC Market Estimates, 1994

Review

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Database Technology

escribe the database structure, and de- ne the relationships between the fields, ecords, or files. This ability to store defi- itions in separate dictionaries instead of n every record simplifies development nd reduces application execution time. The dynamic file resizing function elimi- ates the need for constant file admin- tration by automatically resizing files to row or shrink as records are added or emoved.

VMARK Software, Inc., the leading upplier of advanced RDBMSs used in onjunction with industry-standard open ystem operating environments, can ac- ommodate 70 different UNIX systems rom 20 different vendors, encompassing workstations, personal computers, inicomputers, supercomputers, and ault-tolerant systems. The uniVerse latabase also runs on Novell's UnixWare and will be released on Microsoft Corp.'s Windows NT in the irst half of 1994. VMARK's uniVerse upports Structured Query Language SQL) and the open database connect ODBC), as well as providing desktop in- egration, graphical user interfaces (GUIs), nd object-oriented programming.

VMARK, based in Framingham, MA, narkets its products worldwide through nore than 300 value-added resellers VARs) which provide vertically riented, packaged solutions for small- o-medium size companies, and for lepartmental solutions in large organiza- ions. Competing against the traditional RDBMS vendors such as Oracle, Sybase nd Ingres, VMARK's uniVerse offers a nultidimensional PostRelational data- ase structure that incorporates tradi- ional RDBMS with easy-to-use, owerful, industry-standard systems that ffer flexibility in developing, retrieving nd storing data.

uniVerse, itself, provides:

- Integrated support for SQL and traditional query languages. SQL integration provides the developer with extensive system capabilities including client/server computing, transaction management, and distributed files across common operating platforms.
- Client/server architecture and products to access and operate with other relational and commercial databases across a wide range of computer systems.
- Complete networking, communications and distributed processing capabilities so that a variety of RDBMSs can be managed on a network; a former obstacle to successful client/server implementation.
- A range of 4GLs and industry-standard graphical user interfaces (GUIs).
- Compatibility with thousands of legacy applications on a variety of proprietary systems, enabling proprietary software users to move applications into a more cost-effective open environment.

VMARK's strategy is working.

Earlier this year, VMARK acquired Constellation Software, Inc., the developer of HyperSTAR, a family of object-oriented, client/server products which enables uniVerse to interoperate with Windows-based products, such as WordPerfect, Lotus 1-2-3, and Excel, as well as with commercial databases from Oracle, Sybase and Informix.

Founded in 1984, VMARK offers more than 1,000 commercial applications and has a customer base of nearly 14,000 licensed systems worldwide, representing nearly half a million users. Some of VMARK's users include Anheuser-Busch, Neiman Marcus, the N.Y. Public Library, Carolina Freight, Graceland, the Baseball Hall of Fame, the French Office of National Forestry, the London Underground, Hyatt International Hotels, France Telecom, and the University of Southern California.

An Open Environment

Organizations need to avoid short-sighted solutions. An open environment is key and with that in mind VMARK is planning to offer even more options and open environments in the future. It has also enhanced its customer service with additional classroom training, and training and consulting services.

The strategy is working. Last year VMARK generated $6 million in service revenue and a 61% increase in revenue overall. (Total revenue for the company in 1992 was $18.8 million and topped $30 million in 1993.) Experiencing an impressive five years of revenue and profit growth, VMARK was recently listed in Business Week's top 100 hot growth companies. VMARK has also been selected by IBM as an IBM Business Partner and by Microsoft as an Authorized Solution Provider.

VMARK's international sales total 35% of revenue. The company offers a worldwide customer service organization with several support locations in the U.S., Europe, the Far East, and Australia. Consulting, customer migration and training services are also provided. VMARK also initiates direct sales efforts to industry segments, such as large commercial and government end-users.

Today, users may not be as familiar with PostRelational technology as they are with the traditional RDBMS, but VMARK believes that with its ability to offer a large base of vertical applications, as well as system efficiency, speed, response time, and service — all in an open-system, client/server environment — it's only a matter of time.

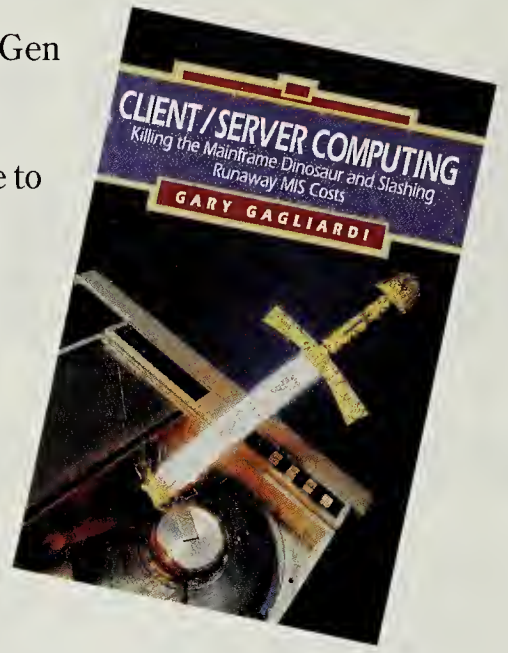
If I could do it all over again...

"If you had to do it all over again, what would you have done differently in the development of your first client/server system?"

Do it all internally	12%
Spend more on user or IS training	10%
Select different client software/ operating systems software	9%
Pick a different hardware server platform	8%
Let a third party do it	7%
Nothing differently	7%
Make sure appropriate network systems management software was available	6%
Choose a different network infrastructure	5%
Spend more time on prototype	5%
Anticipate more or less use	4%

Source: First Market Research's survey of 414 IS professionals

Hitting the books



Gary Gagliardi, president and founder of FourGen Software, Inc. in Seattle, is among the many client/server experts who will tell you it's time to pull the mainframe plug. And as the title of his new book suggests, if cost savings isn't the No. 1 reason to throw away your mainframe, it's certainly No. 2. **Client/Server Computing — Killing the Mainframe Dinosaur and Slashing Runaway MIS Costs** is available for $29 from Prentice Hall.

OTHER BOOKS TO CONSIDER:
From McGraw-Hill (to order, call (800) 262-4729):

Application Development for Distributed Environments *by Dawna Travis Dewire*; 298 pages; illustrated hardcover; $40; ISBN: 0-07-016733-8.

Networking the Enterprise: How to Build Client/Server Systems That Work *by Richard H. Baker*; 381 pages; illustrated hardcover or paperback; $40 (hardcover), $29.95 (softcover); ISBN (hardcover) 0-07-005089-9, (softcover) 0-070-005090-2.

Client/Server Strategies: Implementations in the IBM Environment *by William Marion*; 311 pages; illustrated hardcover; $40; ISBN: 0-07-040539-5.

Beyond LANs: Client/Server Computing *by Dimitris N. Chorafas*; 419 pages; illustrated hardcover; $50; ISBN: 0-07-001057-3.

From Prentice Hall (to order, call (800) 223-2336):

Internetworking with TCP/IP: Client/Server Programming and Applications *by Douglas E. Comer and David L. Stevens*; 508 pages; illustrated hardcover; $50; ISBN: 0-13-474230-3.

From John Wiley & Sons, Inc. (to order, call (800) Call-Wiley):

Implementing Production-Quality Client/Server Systems *by Barbara Bochenski*; 441 pages; illustrated hardcover; $49.95; ISBN: 0-471-58532-7.

• DB/EXPO '94: DATABASE, CLIENT/SERVER & TECHNOLOGY EXPOSITION AND CONFERENCE. San Francisco, May 23-27 — Keynote speakers: Microsoft Bill Gates, Borland's Philippe Kahn, Oracle's Larry Ellison, Next's Steve Jobs and Gupta's Umang Gupta. Contact: Blenheim NDN, Inc., Mountain View, Calif. (415) 966-8934.

• XDB FIFTH ANNUAL INTERNATIONAL USER CONFERENCE. Annapolis, Md., June 5-8 — "Navigating Your Client/Server Course." Contact: Michael Donner, XDB Systems, Inc., Laurel, Md. (800) 488-4948.

• IATA'S INFORMATION MANAGEMENT CONFERENCE. San Diego, June 6-10 — This conference will focus on client/server in the air transportation industry. Contact: Nathalie Thomas at (514) 844-3563 for information.

• DATABASE AND CLIENT/SERVER WORLD CONFERENCE AND EXPOSITION. Boston, June 28-30 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

• THIRD ANNUAL NEXTSTEP EXPO. San Francisco, June 20-23 — Steve Jobs, chairman and CEO of Next, will give the opening keynote address; Scott McNealy, CEO of Sun Microsystems, will give the second-day keynote. Both are expected to address the benefits of object technology for enterprisewide client/server computing environments. Call (800) 767-2336 for Expo registration and pricing information.

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Where Ingenuity Meets Reticence

Columnist Jim Stikeleather recently returned from a trip to Japan, where he witnessed various demonstrations of innovative client/server technologies by retailers. Here are his observations.

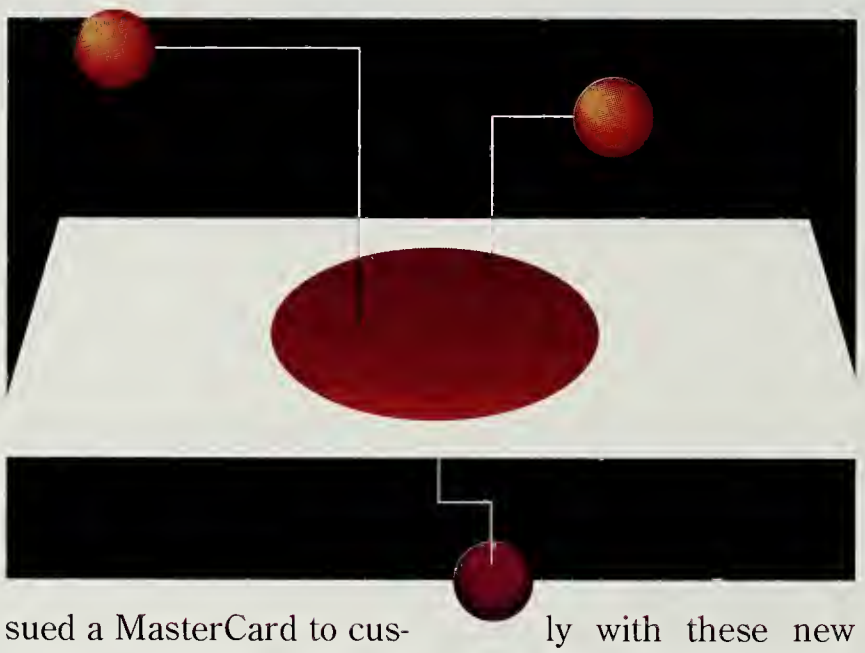
Walking around the Nikkei Store Automation Show, I was impressed with the degree to which the equipment on display was architected on client/server concepts. I saw many multiple tiered systems with functionality distributed across multiple machines supported with a lot of infrared and RF networks instead of wire.

I saw this type of client/server processing and integration in generalized and specialized terminals, workstations, database servers with embedded applications and programmability spread across the network (even to time clocks!).

One personal digital assistant (PDA), for example, had built-in infrared networking that automatically connected to other PDAs in the room as well as a node on a network that had the infrared transceiver. Watching it operate — automatically accessing E-mail, data and applications — was enough to justify the effort to learn Hiragana (the most common form of Japanese writing).

Japanese companies, unlike U.S. firms, see client/server and object technologies as "the right way to do things." They seem unconcerned about cost issues, unlike U.S. firms.

Client/server technology is being applied in limited, though impressive ways. One company had issued a MasterCard to customers and employees that provided customer and employee identification and associated access to facilities, equipment and information (such as special pricing and accumulation of purchase points) across a broad range of point-of-sale, pen-based workstation and server devices.



One pen-based application presented a store manager with his shelf space allocation, shelf inventory, back-room inventory, historical movement and inventory (including price points), in-transit inventory, upcoming promotions and projected movement. It even flagged suggested orders and updated itself whenever it was returned to its docking station, which was connected to in-store and headquarter's systems.

But some companies are not moving aggressively with these new technologies because they are seen as a critical part of business process re-engineering, which in much of Japan is seen as being too disruptive to be applied right now.

Secondly, the Japanese information professional seems to have an even more difficult time making the paradigm shift associated with these technologies than his U.S. counterpart. Several white papers written about U.S. companies suggest that only about a third of IS professionals truly make the transition necessary to fully implement distributed client/server and object-oriented software. Japanese companies I spoke with said IS professionals there had even lower success rates.

Many are unprepared to go forward into full-scale production because of the social implications of such "failure" rates. They continue to look for new ways of training and even alternative organization and implementation strategies that would be culturally more acceptable and consequently would better ensure the success of the new technologies.

The Japanese have a long history of being able to assimilate ideas and technology from other cultures and quickly implement them more effectively and efficiently than the originating culture.

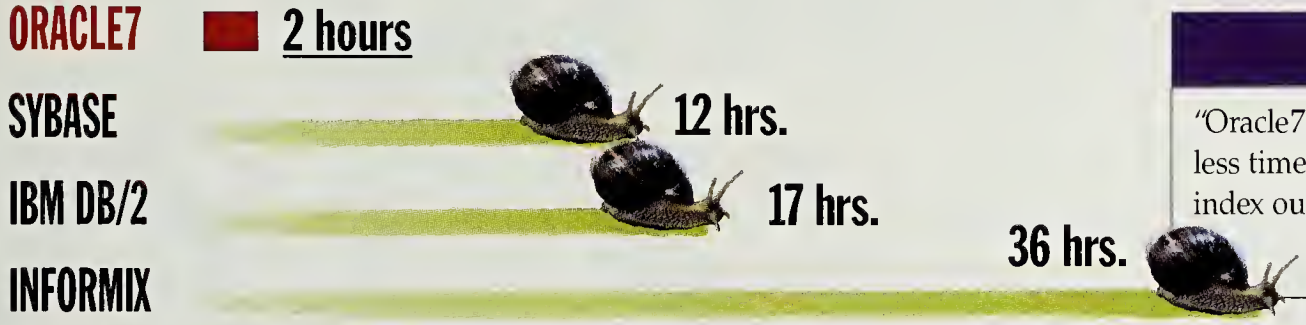
There is little doubt the Japanese will solve the social problems with the new information technologies as well. ◩

Stikeleather is a consulting partner at The Technical Resource Connection in Clearwater, Fla. His Internet address is stike@delphi.com.

ILLUSTRATION BY TOM MONAHAN

Gentlemen, start your snails.

PC Magazine independently defined and ran a battery of real-world performance tests to compare database server software. PC Magazine states, "**Oracle7 was the hands down winner on our performance tests,** outperforming the others by a wide margin."



LOAD AND INDEX

"Oracle7 finished the entire test suite in less time than most took just to load and index our data."

PC Magazine

AD HOC QUERY

"Oracle7 completed the queries in a blistering 47 minutes, three times as fast as...the other products."

PC Magazine

CONCURRENT RANDOM WRITE

"Even with the many new features that were added, we found Oracle7 to be exceptionally stable"

PC Magazine

CONCURRENT RANDOM READ

"Oracle7's read-consistent model and record level locking helped it breeze through the test."

PC Magazine

Just to be fair, here's what PC Magazine had to say about the other guys:

Informix OnLine *"Only after days and days of repeated crashes were we able to obtain a full set of results."*

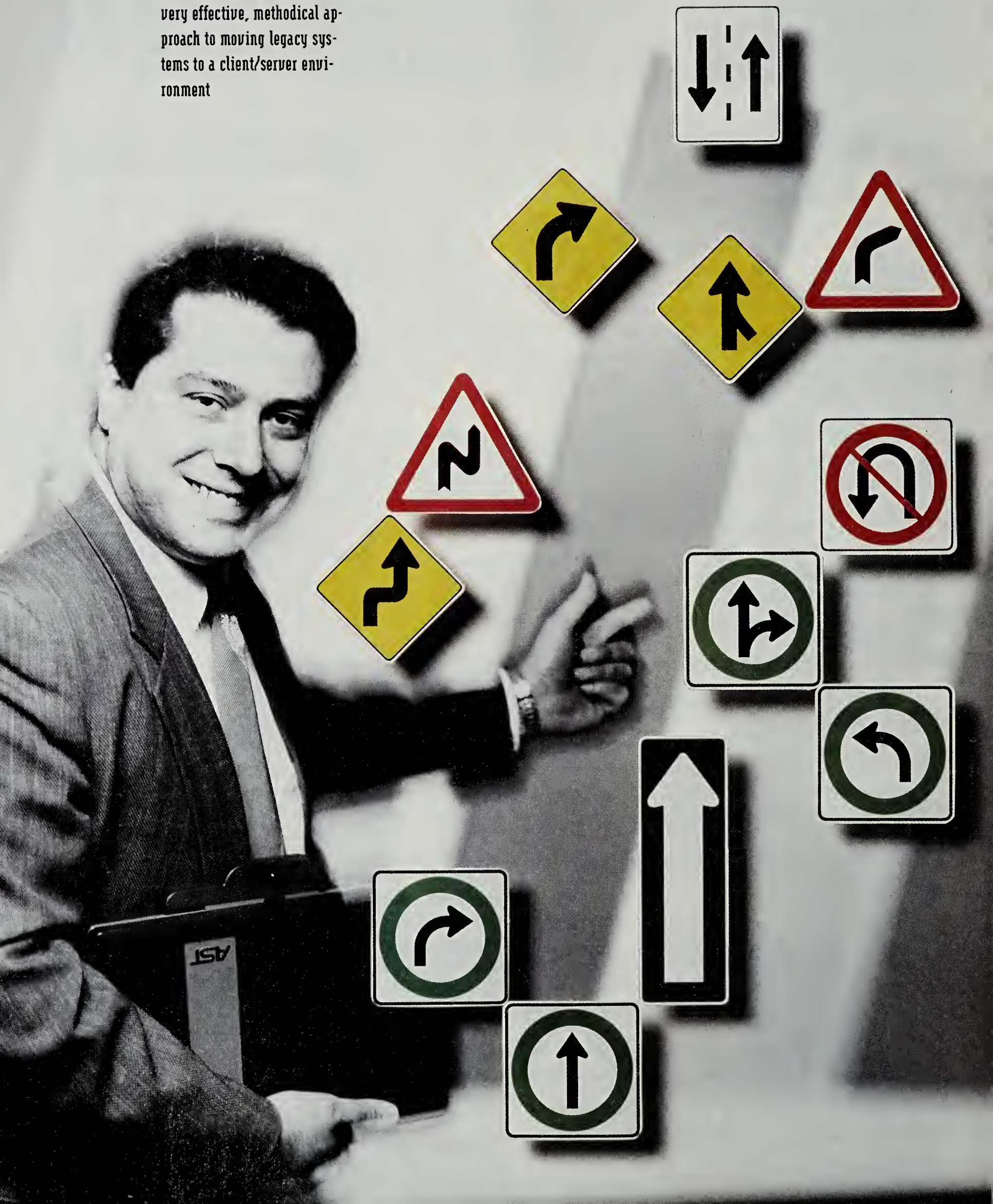
Ingres Server *"...we would not recommend it because of the showstopping multi-user bug we encountered."*

Gupta SQLBase *"...took an unthinkable 60 hours to load the tables and then crashed on the index builds..."*

For your copy of the complete PC Magazine article, including test results call 1-800-633-0750 Ext.6529.

ORACLE

CIGNA'S SAM GROSS detailed a very effective, methodical approach to moving legacy systems to a client/server environment



Getting There

If you are ready to push your aging mainframe out of your data center and off a cliff, be warned: The path to client/server is trickier than it looks.

Smooth legacy-to-distributed-systems migrations are tough to come by. Why?

- Many organizations fail to realize the importance of ensuring data quality before attempting to migrate legacy applications to client/server.
- Data modeling projects often run longer than most Broadway musicals.
- Despite vendor hype and promises, few software tools exist that will answer all your migration needs.

Mainframe migration often means coexisting with PC LANs

"There's really not a lot of software migration tools that people can hang their hats on," said Wayne Eckerson, a senior consultant who oversees mainframe migration issues at Patricia Seybold Group, a Boston-based consultancy.

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From Here

BY THOMAS HOFFMAN

PHOTOGRAPHY BY NICK KELSH

IBM Client/Server

The difference between rehearsal and performance is experience.

Client/server computing is great for your people because it gives them easier access to more information, and it's great for your business because it removes barriers between existing systems. Even ones that now perform solo can be playing together, giving you new flexibility—to improvise, to reorganize, to reengineer.

So your question isn't whether to explore client/server, it's what to look for in the

people who help you, and here's a suggestion. If they don't have a long list of references in multiplatform, multivendor integration, and if they don't have a working knowledge of your kind of business, you should call someone who has. Someone like IBM.

We have more experience with more kinds of platforms, operating systems, networks and industry applications than anyone. Which is what client/server is about. So when we custom-tailor your solution, we can be more objective about your options than single-platform vendors and more understanding of your needs than third-party consultants.

Also, we keep careful track of what we've learned. Every client/server solution is unique, but we take advantage of similarities by comparing your situation with ones we've faced before. And at any stage—from initial consulting to implementation—we can call on client/server specialists from around the globe. What's more, we now have 40 IBM Open System Centers worldwide for testing multivendor solutions before installation. Nobody wants to be a vendor's rehearsal, and with us you won't be.

We've built hundreds of client/server solutions, and we can help you. To learn more, call us at **1 800 IBM-3333**, ask for extension "star" 802.

From page 21

Lengthy data migration projects are usually quite costly, too. John Donovan, a senior consultant at WorkGroup Technologies, Inc. in Hampton, N.H., recalled the story of one chief information officer who had committed $1 million annually to a three-year client/server data modeling project. Donovan said the CIO was forced to scrap the effort a year early because the project had yet to yield any demonstrable bottom-line results.

Plus, the cost of software tools designed to ease data migration can be exorbitant. For example, the Arizona Public Service, a utility that is in the early stages of migrating its legacy human resources data to a Unix-based client/server environment, plunked down $200,000 last year to acquire Texas Instruments, Inc.'s Information Engineering Facility (IEF), a computer-aided software engineering tool the company is using for data modeling.

But it was a catch-22 situation: Without TI's information engineering methodology, it would have been extremely difficult for the utility to remodel its human resources applications to meet its current business requirements, according to Don Kimbrial, a senior programmer at the Phoenix-based group. The IEF software "gave us an understanding of all the entities that support our human resources business and what applications were needed to support the business processes," he said (see story page 26).

Indeed, some savvy organizations have taken pragmatic approaches to data migration, which helped yield impressive results without depleting their information systems budgets. Case in point: Cigna Corp.'s New York insurance operation, which recently completed a one-year, $2.25 million project to move its Special Risk division from an IBM mainframe environment to an IBM OS/2 LAN Server scheme. An effective blueprint for that project helped Cigna keep its data migration costs under $100,000.

The Cigna division handles unique insurance needs for Fortune 500 accounts, such as insuring the power generation plant at the World Trade Center. Because it deals in a competitive market with a finite customer base, the Special Risk unit requires faster information delivery and access capabilities. In 1992, the firm decided a client/server scheme would fit the bill, noted Sam Gross, Cigna's manager of advanced technology integration.

The group already had the client machines installed, with roughly 1,000 Intel Corp.-based IBM and AST Research, Inc. workstations used to collect critical customer data across 12 branches. Key to the strategy was evolving the PCs into a client/server environment to access data that would be migrated from IBM IMS and Information Builders, Inc. hierarchical mainframe databases to Microsoft Corp. SQL Server relational database management systems.

Cigna started by dividing its data migration strategy into two manageable pieces. The insurer evaluated each branch's data collection processes, or how the data was being stored locally by special risk insurance agents. Gross and his team quickly realized the importance of analyzing the quality of the data that was being stored locally because the insurance agents themselves would ultimately become the "owners" of that data under the client/server domain.

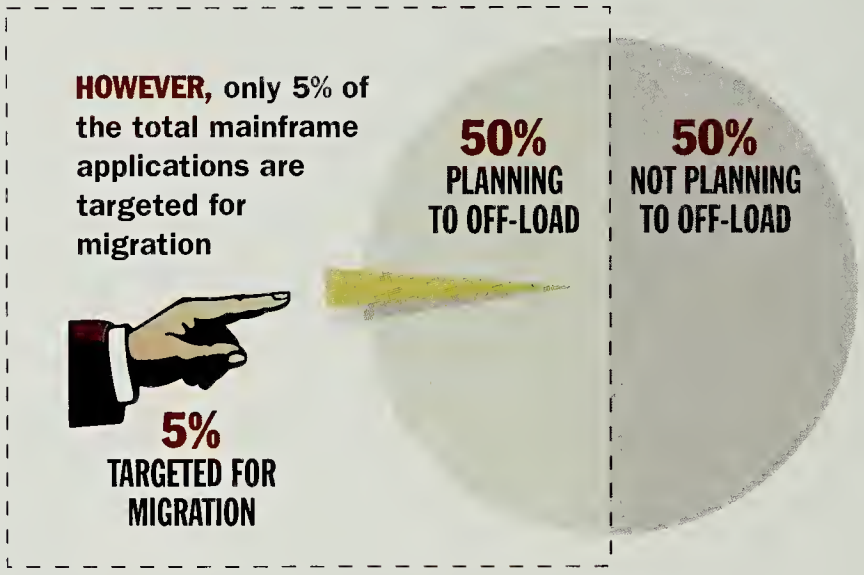
Next, Cigna's IS group evaluated its ability to distribute data to the branches. Gross said he wasn't totally pleased with the results of those efforts. "It's virtually impossible to get multiple, functional organizations within a company together on the

Please turn to page 26

Lengthy data migration projects are usually quite costly.

COST BENEFIT?

HALF THE PEOPLE surveyed by Gartner Group at Symposium '93 are planning to off-load existing mainframe applications to a smaller platform



BASE: 400 SYMPOSIUM '93 ATTENDEES; SOURCE: GARTNER GROUP, INC.

CAVEAT: Off-loading 10% of your applications does not translate into a 10% cost savings. That's because a majority of applications remain on the mainframe, a work load that requires considerable maintenance.

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John Morrell, International Data Corporation:
"The Informix Dynamic Scalable Architecture has the potential to vault Informix past its primary competitors for high-end database processing functionality."

David McGoveran, Alternative Technologies:
"The new Informix database server architecture will put the vendor ahead of competitors Oracle and Sybase in support of multiprocessing systems."

Peter Kastner, Aberdeen Group:
"Sybase and Oracle lack the clarity of Informix's architecture. They're going to have to go back to their labs."

Gordon Kerr, Senior VP, Management Information Systems, Hyatt Hotels and Resorts:
"What Informix has done with DSA is make it much easier for me to plan for the future. We're beginning to deploy symmetric multiprocessing hardware through our organization, and I know that if and when we determine we need to scale up to loosely coupled or MPP machines, our Informix applications will be able to make the move with us."

Michael Bloomberg, Bloomberg Financial Markets:
"Informix developed core internal parallelism in DSA, which is different than other types of add-on parallel database capabilities we've seen. Since the parallel processing features are internal, rather than external, we're expecting impressive performance gains. It's clear that Informix thought this technology through."

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INFORMIX®

Continued from page 24

type of data that they need and how to get it," he said.

When it came time to select a data migration tool, Cigna decided to use Information Builders' PC Focus tool kit — its developers had used Information Builders tools for years — and Cognos Corp.'s Impromptu, a Windows-based data access tool that lets users perform complex queries in a graphical fashion.

To support its graphic information access requirements, Cigna selected EDA/EIS for Windows from Information Builders and MapInfo for Windows, a desktop mapping package from MapInfo Corp. in Troy,

An effective blueprint helped Cigna keep its data migration costs under $100,000.

N.Y. The MapInfo product, for example, was ideally suited to enable Cigna's special risk agents to track how many properties the company insures at a particular ZIP code or in a region that is prone to floods.

At the decision-support end, Cigna began using Information Discovery System, a data patterning tool developed by IntelligenceWare, Inc. in Los Angeles that was designed to analyze database information. The product automatically generates hypotheses on data patterns and anomalies. Data patterning tools such as Information Discovery System and PowerPlay from Cognos have helped Cigna "look through mountains of data and highlight basic patterns rather than force our staff to search

Please turn to page 28

ARIZONA PUBLIC SERVICE'S Don Kimbrial is hoping for a distributed computing surge

UTILITY CHARGED BY CLIENT/SERVER

Arizona Public Service, a Phoenix-based utility that generates electricity for 600,000 state residents, is hoping re-engineering initiatives launched last year will provide the utility with a healthy productivity jolt. With competition increasing in the utilities industry, Arizona Public Service was forced to improve its business processes, which included moving off its two IBM 3090 mainframes by the year 2000.

The utility is planning to tackle its legacy data migration in small chunks beginning in January 1995. It will transfer its mainframe-based human resources applications running under IBM's DB2 to Computer Associates International, Inc.'s recently installed CA-HRISMA running Windows-based clients and IBM OS/2 servers, according to Don Kimbrial, a senior programmer at the utility.

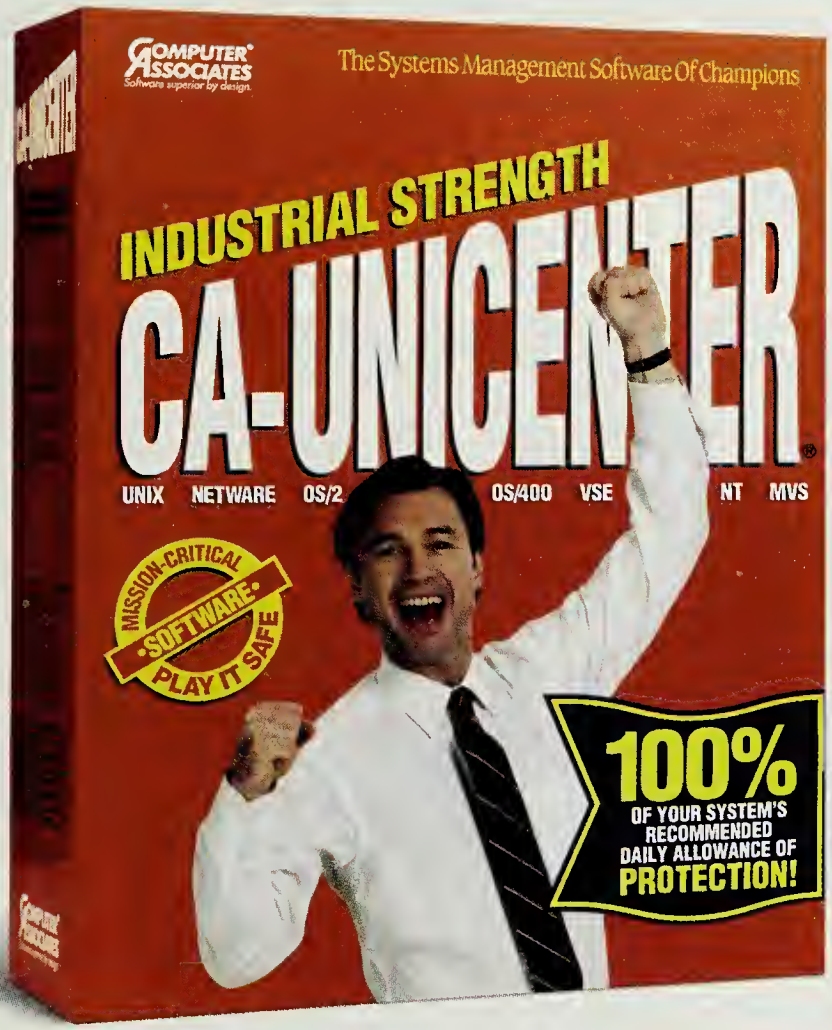
"Moving all of your processes off the mainframe to a distributed platform is like eating an elephant — you have to do it one bite at a time," he said.

The CA package was chosen to ensure a smooth transition, Kimbrial said, because it will continue to support the host-based systems while the utility ports the legacy data to a Unix-based Sybase, Inc. engine.

The utility is using TI's IEF tool set for data modeling, though it has yet to select a data migration package. Kimbrial said he isn't concerned about finding the right migration tool set. "Since DB2 and Sybase are both relational, it shouldn't be a problem to build flat files and pull them down to the distributed platform," he said. That is not to say the utility hasn't had to deal with any high-voltage data migration issues yet. "The security of the data is the toughest challenge we've had to face so far," he said.

PHOTOGRAPHY BY REED RAHN

For A Fortified Client/Server Environment, Add This To Your Diet.



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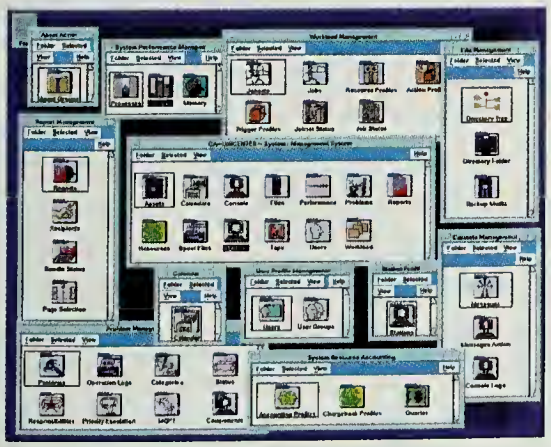

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Continued from page 26
through data," Gross said.

The physical migration of the data was completed in the first quarter of 1993. After establishing the client/server communications infrastructure last September, the IBM OS/2 LANs were installed. Data migration was completed by the end of 1993. By mid-January, the applications were up and running.

Compared with data migration efforts conducted by other organizations, Cigna's legacy-to-distributed system transition was completed over a relatively short one-year period. Still, Gross had expected the project to be completed in about half the time. "The reality is that it took a more iterative approach than we had anticipated," he said.

Cigna's methodical but effective approach to legacy data migration is a technique that several industry experts recommend. Another tack to consider is a "surround strategy," where certain applications that lend themselves to client/server are moved to distributed platforms while other, less time-sensitive programs remain on the mainframe. While supporting the coexistence of multiple platforms can be costly, the surround strategy is often a safer path, Patricia Seybold's Eckerson said.

"Some companies need to use the surround approach because their existing environment is so complex. If your organization has more than one mainframe or supports high-volume OLTP, then it's exceedingly difficult to make that transition to client/server overnight," he said.

Others grappling with data migration efforts have met with mixed results. Bristol Myers Squibb Co. in Stamford, Conn., is about 25% completed with a project to merge its consumer product divisions, the Clairol unit and its Monarch Crown subsidiary. As part of those efforts, the combined entity — Bristol Myers Squibb's Consumer Products Group — is centralizing its customer, product and price databases on Industri-Matematik, Inc.'s System ESS Order Management software, a Unix-based, order-entry management system that runs on a Hewlett-Packard Co. HP 9000 server in the company's Evansville, Ind., data center.

Grappling with data migration efforts has met with mixed results.

Because the ESS system provided well-defined data models and glossaries, the Consumer Products Group's IS staffers did not have to construct the entire data migration map themselves, according to Joe Marconi, a systems information manager at Bristol Myers Squibb. "Bringing multiple files together from all three organizations was a challenge in itself," said Marconi, referring to the bulk of the IBM 3090 mainframe data that has to be reconfigured for the Oracle Corp. Unix RDBMS.

The project, which Bristol Myers Squibb is planning to complete by year's end, is expected to help the firm reduce the cycle time for order management, Marconi said.

For some organizations, data migration is assisted by both off-the-shelf tools and in-house programming. John Huber, manager of commercial systems at a Denver-based mining company, said his firm has been migrating its core business applications from a suite of Unisys Corp. A Series mainframes to smaller and less-expensive Unix boxes during the past three years.

Although the new environment is 30% less expensive to maintain than the Unisys mainframe setup, the mining company had trouble finding adequate Unix migration tools to help it transmit data to an Oracle RDBMS.

"When we got into the Unix environments, some of these end user utilities weren't really there," Huber said. Although the company derived some data transfer benefit from Lawson Software's Universe package, the mining firm had no way to electronically transmit the data onto the target machines. In the end, the legacy data was dumped onto 9-track tapes, uploaded to the Unix machines and copied onto the Oracle databases, a weekend-long endeavor that Huber still refers to as "a nightmare."

In hindsight, Huber said he is still not sure whether the company's laborious data migration efforts outweighed the alternative: a $60,000 data migration solution that Unisys had offered. "It seemed expensive at the time," Huber said. "Then again, maybe it wasn't that expensive after all." ◩

Hoffman is a Computerworld *senior correspondent.*

CONVERSION CAVEATS

- **Make sure your existing infrastructure is in order. If your organization has creaky, wheezing systems in place, clean those up before embarking on data migration projects.**
- **Be rational in your expectations. Don't expect to move all of your data over; pick and choose that which is critical.**
- **Evaluate existing platforms to determine how desperate your organization is to move off legacy systems. For example, consider a "surround strategy" in which some mainframe applications continue to be supported while you're rolling out distributed applications. The downside: the cost of supporting both environments.**
- **Design the new infrastructure to support your business requirements for the next two to five years. Then look at open systems compliance of different vendors.**
- **Don't forget your staff: Make sure effective training is implemented and good communications enforced; find out what the needs of non-IS workers are; and make sure IS employees are good communicators and listeners.**

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		1992	**1993**
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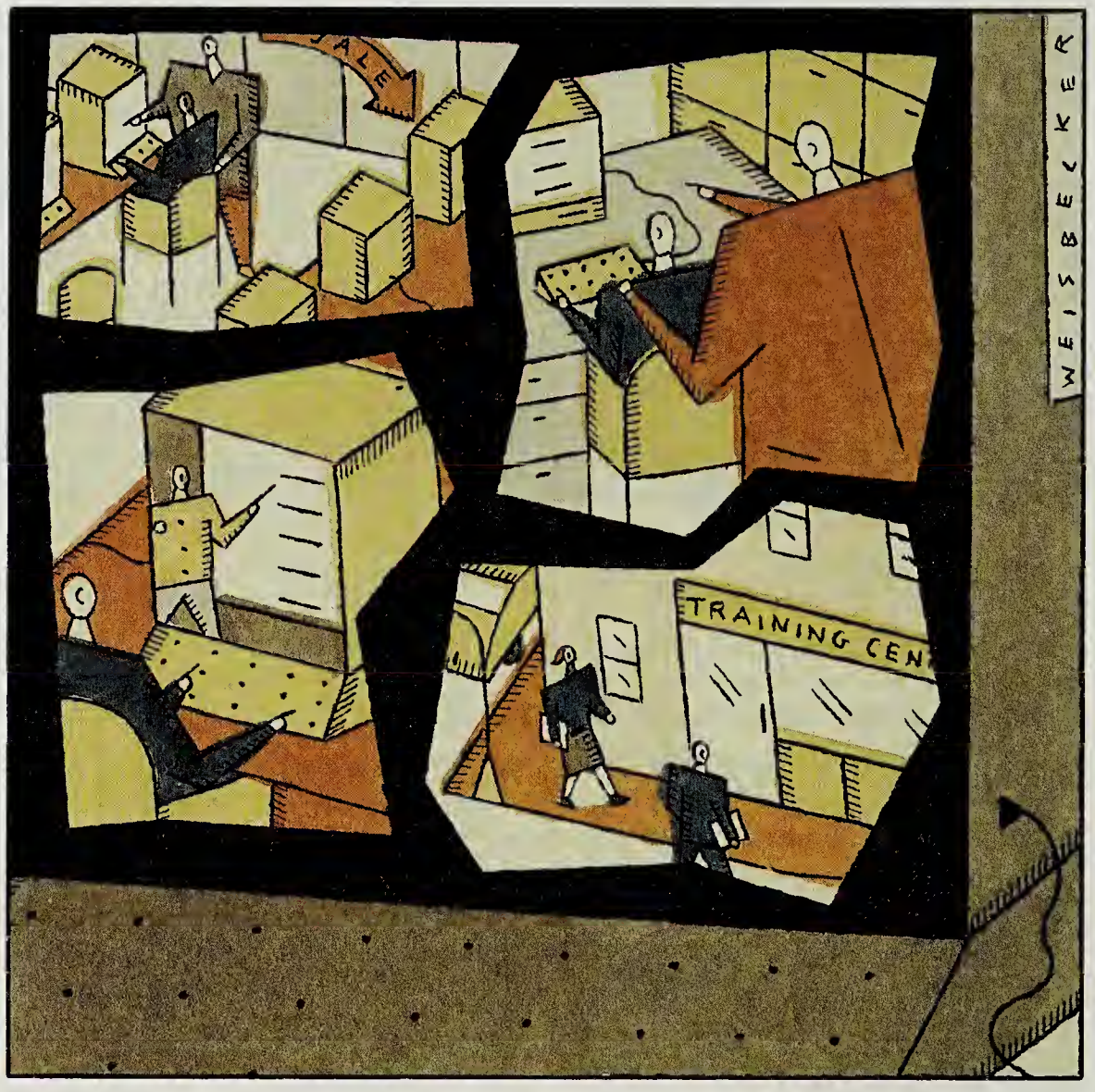

When Ron Thompson looked a couple of years ago for a way to move GTE Data Services into client/server computing, he discovered it was not hard to supplement overworked GTE training experts with outside assistance.

In fact, he found that a whole mini industry has grown up to train corporate workers how to make the transition from mainframes and other proprietary computers to client/server.

Traditional large consulting firms, specialized computer industry trainers and even computer vendors have jumped at the lucrative opportunity to help the uninitiated make the leap to the new technology. Thompson, manager of technical training at Tampa, Fla.-based GTE Data Services, a unit of GTE Corp.'s telephone operations, said the wide availability of client/server training firms gave him the luxury of choosing his outside trainers carefully.

"Over the last three years, we've looked at materials from 20 to 30 companies that are in the training business. And I continue to get stuff every day from other companies. Training is a big business, and a lot of it is driven by client/server systems," Thompson said.

Please turn to page 32

BY STEVE ALEXANDER

ILLUSTRATION BY PHILIPPE WEISBECKER

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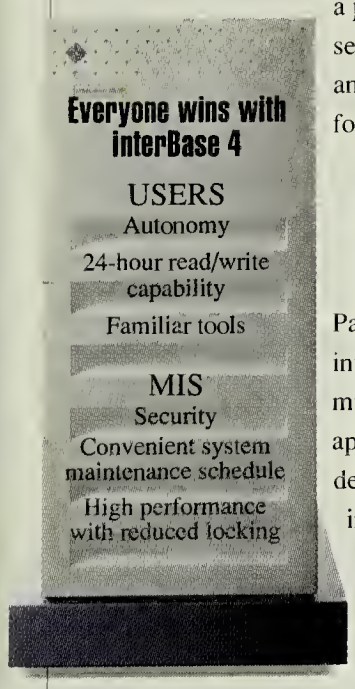

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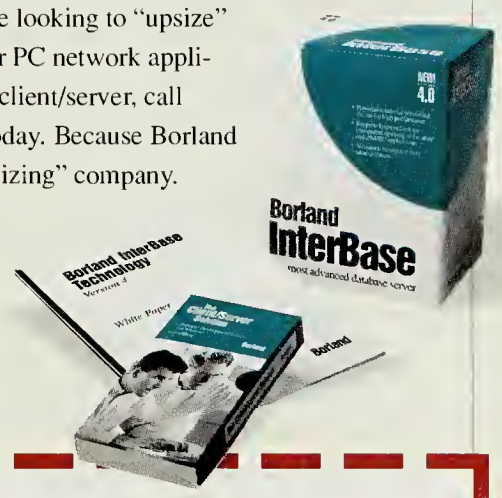

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INVEST IN-HOUSE

SEA-LAND MAKES the up-front investment in retraining existing staff in the company's new technologies

Sea-Land Services found that client/server training can be good for company morale.

A $3.2 billion worldwide transportation company, Sea-Land is shifting part of its operations from mainframes to client/server to provide better and more timely customer access to shipping information while cargo is en route. Initially, client/server systems are being installed at shipping terminal yards, where cargoes are received and clear customs.

"Over the last three years, we found ourselves going out on the market to get high-priced consultants to do client/server work," said Dona Anthony-Negron, Sea-Land's director of systems administration in Liberty Corner, N.J. "But when you do that, your budget goes out of whack because you pay a lot to get these projects done. And it also sends a bad message to your people. It says they are valuable when you are doing mainframe work, but when it comes to the newer technology, you need to hire consultants to do it."

Sea-Land, therefore, has opted not to give client/server work to outsiders but to train its own IS staff. "That becomes an incentive for people to stay in the organization because they don't need to jump ship to keep their skills up. And it helps control the data processing budget," Anthony-Negron said.

Sea-Land also uses training from The Chubb Institute, Powersoft and Microsoft Corp. And it has used some specially trained workers from Chubb's Top Gun program.

While Sea-Land has been using outside client/server training only since mid-1993, Anthony-Negron is already convinced that "training needs to be 'just in time.'

"People need to walk out of a class and use what they've learned very quickly. If you send people to class to learn something they'll use in three months, you may as well wait three months before you send them to school because the chance of them remembering it disappears very quickly," she concluded.

Continued from page 30

Client/server training has become such a big business that it comes in several subspecialties, all of which can be tailored to the needs of individual customers. There is traditional classroom instruction; automated self-paced learning via disk, CD-ROM or videotape-based course materials; and a new training wrinkle from The Chubb Institute in Parsippany, N.J., that provides specially trained client/server information systems employees that a company can hire temporarily as full-time workers.

This gives corporations seeking client/server training a lot of choices. For example, when Sea-Land Services began its move to client/server computing last year, the international cargo shipping firm was able to decide in which situations it would use outside help to retrain existing employees and when it would use new, pretrained employees from Chubb.

Good training helps control other client/server expenses.

The Chubb pretrained temp program, known as Top Gun, "provides us with good entry-level prospects. Most of these people are going into this as a second career, so the attractiveness to hire them is that they have some business savvy that raw college recruits do not have," said Dona Anthony-Negron, director of systems administration at Sea-Land's 325-employee information technology department, based in Liberty Corner, N.J.

But Sea-Land is also typical of corporations that realize the huge stake they have in retraining existing employees who have previously worked on mainframes or other older technologies.

"We are absolutely committed to retraining our own people. That's our No. 1 priority. Bringing in the Top Gun candidates is simply supplemental," Anthony-Negron said.

Corporate competitiveness, which is fueling the move to client/server in the first place, is pushing companies to more effectively train employees to harness the new technology's advantages.

For example, Thompson said GTE's heavy emphasis on client/server training is directly related to the telephone firm's effort to make its customer billing systems as accurate and timely as possible for competitive reasons. "We need very sophisticated systems so we can respond to customers with just one or two phone calls because they can go somewhere else for telephone service, especially if they are large business customers. And they will if we don't provide the kind of service they expect."

Training can make a difference in whether new client/server technology is cost-effective. Gartner Group, Inc. in Stamford, Conn., calculates that training facilities, materials and teaching time account for about 5% of the cost of moving to client/server. Training is costly because it is labor-intensive, but it may be one of a corporation's wisest investments because good training helps control

How Are We Doing?

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Please take a few minutes to answer the following questions and fax this sheet back to Editor Alan Alper. Thank you.

1. Using a scale of 1 to 5 with 5 being very useful and 1 being not very useful, please rate our coverage of:

- ☐ **A.** Technology trends
- ☐ **B.** Market analysis
- ☐ **C.** Client/server applications in vertical industries such as services, manufacturing, public sector
- ☐ **D.** Product reviews
- ☐ **E.** Product comparisons
- ☐ **F.** Well-known vendor personalities
- ☐ **G.** Vendor strategies
- ☐ **H.** User strategies

2. Please rate the following on a 1 to 5 scale, where 5 is the most important benefit and 1 is the least important benefit you obtain from *Computerworld Client/Server Journal*:

- ☐ **A.** Helps me do my job better
- ☐ **B.** Provides information on technology directions
- ☐ **C.** Helps me stay up to date on what my peers/competitors are doing
- ☐ **D.** Other (fill in)

_____

4. What do you like most about *Computerworld Client/Server Journal*?

_____

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5. How can *Computerworld Client/Server Journal* be improved?

_____

_____

6. Using a 1 to 5 scale, where 5 is very good and 1 is very poor, please rate the following articles in this issue:

- ☐ **A.** PacifiCare Picks Up the Pieces
- ☐ **B.** Heading Off Server Constraints
- ☐ **C.** A Matter of Choice: Charting an Object-Oriented Course
- ☐ **D.** Getting There from Here: Mainframe Migration Often Means Coexisting with PC LANs
- ☐ **E.** Managing the Storage Mess: Fatware Puts Increased Burdens on Networked Disk and Tape
- ☐ **F.** What's Next from Steve Jobs?
- ☐ **G.** The Changing Face of Software Licensing
- ☐ **H.** *Column*: Back to the Future?
- ☐ **I.** *Product Comparison*: Microsoft Access/Powersoft PowerBuilder
- ☐ **J.** *Product Review*: Computer Associates' Unicenter
- ☐ **K.** *Exclusive Survey*: Do Client/Server Projects Pay Off?
- ☐ **L.** Did not read the issue

7. (Optional) Please tell us about yourself. This information will be used for reference only. Your views will be kept confidential.

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other client/server expenses, said Ken Dec, a Gartner Group client/server program director.

Companies such as Hewlett-Packard Co. see client/server education as a market opportunity.

Dave Deasy, HP's Americas Educational Services marketing manager, said HP has been successful at teaching corporate information technology people what client/server computing is, what advantages it offers and the specific technologies involved, such as distributed computing and distributed management, information technology standards, open systems environments and security, object-oriented programming and multivendor environment networking.

Retraining a company's existing employees is well worth it.

Tom Ormseth, HP's Americas Educational Services operations manager, said that HP's 2-year-old client/server training program has become a profitable stand-alone business. He said he believes the big corporate switch over to client/server is going to provide plenty of business for HP's training operations for another two to five years.

Powersoft Corp., based in Burlington, Mass., is a smaller vendor that for the last year and a half has been providing group training on its own PowerBuilder software and related topics, including an introduction to client/server.

According to Maria Morrissey, director of services business management at Powersoft, client/server training is a growing business "because there's so much you need to know in client/server. You need to know Windows, graphic user interface, all about database design and how to develop applications with an object orientation."

The big consulting companies are in the client/server training business, too. Hugh Ryan, director of New Age Systems Architectures at Andersen Consulting in Chicago, said his firm got into training as an extension of an internal shift to client/server four years ago. After training 5,000 of its employees, Andersen offered the courses to its customers, but no more than 20 Andersen customers have asked for it, Ryan said.

But corporate employees seem more willing now to switch to client/server than they were only a few years ago, Ryan noted. "Four years ago, when we did a study for a customer, only 20% of employees wanted to change to client/server. More recently, we've found that number is much closer to 70% to 80%," he said.

Improved training is one reason for the switch in employee attitudes, but equally important is a change in employees' outlook. "Most systems analysts, programmers and designers realize that this is where the future is, and so they are more willing to make the sacrifice to retrain," Ryan said.

Rob Williamson, product manager for client/ server computing at the National Education Training Group (NETG) in Naperville, Ill., said one of the big hurdles trainers have to overcome is the confusion that sometimes afflicts longtime corporate employees who have spent 20 years programming mainframes. "They are somewhat bewildered. As one of my customers said, it's the perception that there's an impenetrable mountain of knowledge that's required for client/server," Williamson said. "It's not an impenetrable mountain, but that perception is why companies need to manage the change to client/server."

Retraining existing employees is well worth it, he added. "People who have 20 years' investment in an organization understand a structured approach to developing applications, and they are a tremendous asset to an organization."

NETG offers instructor-led ▶

VARIETY PACK

GTE'S RON THOMPSON counts on various training methods for client/server

GTE Data Services knows how to select the right training firm. The criteria Ron Thompson, manager of technical training, uses to select a training firm are the size of its training course library and its ability to roll out the same training in other GTE locations around the country. "There is no one way to provide training that is absolutely right for every case. We use combinations of self-paced training [from NETG], instructor-led training by in-house staff and vendor-provided training depending on what's most effective," he said.

Two years ago, when GTE was using mostly outside training, the cost per programmer was about $8,000. Today, with a 50/50 mix of in-house and outside training, the cost per programmer is $4,000 or less, he said.

At GTE, the big difference between client/server training and the old mainframe training is employee accountability.

"It's not enough just to attend the class anymore. We are being paid to teach the class, and the students are being paid to attend, get the proper skills and put those skills to work for the company," Thompson said.

The training is working, he said, because employees want more education to advance their careers and because there is fear of being outdated by advancing technology. "Either you get on the train or it leaves you behind."

Continued from page 33

training on-site, but its main product is multimedia, self-paced training on CD-ROM, disk, networks and videotape.

The firm teaches courses in client/server concepts, cooperative processing, architecture, security, migration from legacy systems, rightsizing and retraining issues. It also has specific courses on topics such as relational databases, SQL Server, IBM's DB2, Sybase, Inc.'s database and object-oriented programming.

Whether automated, self-paced instruction works as well as live-instructor teaching depends on whom you ask, although self-paced education is usually less expensive because the teaching materials can be reused many times. "There is no magic formula," GTE's Thompson said.

But HP, which uses NETG to train its employees in specific client/server technologies rather than relying on its own more general course offerings, favors the self-paced approach for consistency. "If you use the same self-paced product throughout the company, then everybody hears the same words, the same terminology," said Ingo Zinner, learning technology specialist at HP's corporate information technology training organization in Colorado Springs.

The biggest problem trainers face is rapidly changing technology.

In a classroom with a live instructor, "the message does change," Zinner said.

But no matter how conveniently the training is packaged, learning client/server doesn't happen overnight. According to Thompson, programmers need at least six months to reach the same level of proficiency in client/server that they formerly had in mainframe technologies.

Not everybody thinks retraining is the way to go, however. Henry Crouse Jr., vice president at The Chubb Institute's Programmer Resources, which offers the Top Gun temps, said his service is marketed as an alternative to retraining existing employees in client/server technologies.

Crouse said the service allows existing employees to continue what they're doing while new people take over client/server jobs. Under the Top Gun program, corporations in the metropolitan New York area can hire a Chubb temporary employee trained in client/server for eight months at a cost of $270 to $285 per day per person. During that period, the customer company evaluates the temp and has the option to hire him from Chubb. If the temp isn't hired, he returns to Chubb's pool of client/server personnel.

"Most of the people that corporations want to retool are mainframers. To get them to understand PC architecture and object-oriented design is incredibly difficult. It's easier to bring in a junior person with an unbiased view than to retrain your own staff," Crouse said. "It's kind of like the old contract programmer with a more positive turn. We've taken the risk out of hiring data processing talent for the client/server marketplace."

Tim Rucinski, sales manager at Chubb Advanced Training, said the biggest problem his trainers face is rapidly changing client/server technology. "Things just move so fast that everyone seems to be in the process of catching up all the time," he added. ◩

Alexander is a Minneapolis-based journalist who reports on technology.

RHYME AND REASON

WEYERHAEUSER TEAMED UP with HP for a four-phase approach to client/server training

Weyerhaeuser Co. found that the best way to train employees in client/server technologies was to teach them why it matters to the business.

"It sets the stage for understanding why the change is necessary and what advantages you are looking for from a business perspective," said Carl Presley, open systems partnership manager at the $9.5 billion Tacoma, Wash., timber and paper products firm. "And it sets up the framework for employees being part of achieving a corporate goal. Otherwise, you run the risk of having people say, 'I don't understand what's in it for me. Why should I change?' "

Weyerhaeuser is shifting away from a mixed collection of proprietary computer systems, including Digital Equipment Corp. and HP minicomputers and IBM AS/400s and mainframes, to an open client/server scheme. "As part of our decision to move to open systems, we evaluated several companies and came to the conclusion we should form a partnership with a technology provider to help us because our experience base in open systems was quite low," Presley explained.

Weyerhaeuser uses HP's client/server training as part of a four-phase approach to training, which includes "awareness building" among employees, understanding how the technology helps the business, skills building and implementing the lessons taught. Now in the third, or skills, phase of training, Weyerhaeuser is experiencing intensive training in Unix fundamentals and advanced Unix.

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Project Management Morals

By David Kelly

Managing the transition to client/server does not have to be a daunting, career-ending project. By taking the advice of people who have experienced the process, you can succeed.

Client/server computing is not a destination; it is a process that is still unfolding. Changing hardware and software make client/server development tougher than building mainframe software.

"Many of the constructs that our managers took for granted in the mainframe world did not exist in the client/server world. It made it very uncomfortable for them," said Majid Naderkhani, assistant vice president of business systems development at Sprint Corp. in Kansas City, Mo.

When Sprint converted IBM 3270 applications to client/server systems over an 18-month period, its managers needed a new perspective. Instead of taking hardware and software configurations for granted, they had to look at networks, server locations, customer needs and processes.

Understanding the demands of client/server requires a flexible attitude. As software development manager at Standard Commercial Tobacco in Wilson, N.C., Frances Williams learned by making mistakes. When Standard Commercial started a client/server transition three years ago, it selected DataEase 4.2 by DataEase International, Inc. as its main programming tool. But Standard Commercial managers found they had selected the wrong product.

"After developing small applications, we found that we needed the ability to develop more complex code structures than DataEase allowed for," Williams said.

It then switched to Powersoft Corp.'s PowerBuilder 2.0 because it gave the company more control over the code. The rollout of the first phase of the application was finished last July and was a complete success.

When Don Weimann, staff specialist for application delivery tools at Chevron Information Technology Co. in San Ramon, Calif., developed a customer service client/server application, he found that "wide-area learning" was crucial. "The breadth of learning was the biggest difference," Weimann said.

One crucial aspect of moving to client/server is maintaining knowledge transfer between employees. Managers can facilitate this by seeding people from one application to the next, ensuring employees can access bulletin boards such as CompuServe and by setting up company-based exchange sessions.

Former mainframers might be tempted to design graphical user interfaces (GUI) that look like 3270 screens. But it is important to train people to make productive GUIs.

Some managers accomplish this by having younger programmers develop the user interface and making former mainframers responsible for maintaining data integrity.

Client/server transitions may not be easy, but managers can help the process by building morale. Managers should make sure there is two-way communication. They should also solicit feedback from employees, in addition to making sure the staff "buys in" to the transition plans. ◩

Kelly is a free-lance business and technology writer in West Newton, Mass. He can be reached via CompuServe at 71011,2262.

ILLUSTRATION BY BETSY LYON

How to Unravel the Client/Server Mystique.

First, accept that there is no mystique. Rather, there are hordes of slightly frantic software companies content to have you believe that effective open system solutions remain elusive while they rush to understand, develop, and market their interpretation of client/server. Then there's Lawson Software.

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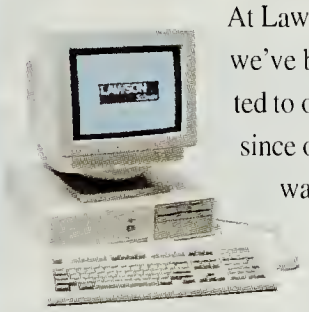

At Lawson Software, we've been committed to open systems since our company was founded in 1975. We've always believed that to be a valuable business partner, an applications provider must offer choices for business strategy development. So for us, client/server isn't a new phenomenon. Instead, it's the next logical step in our development. And it exists today – fully developed and fully functional – in the latest release of our enterprise-wide, cross-industry, world-class business application software.

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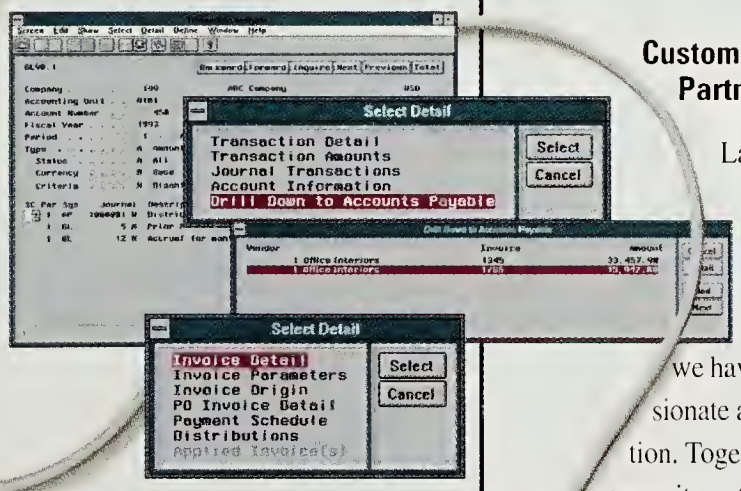

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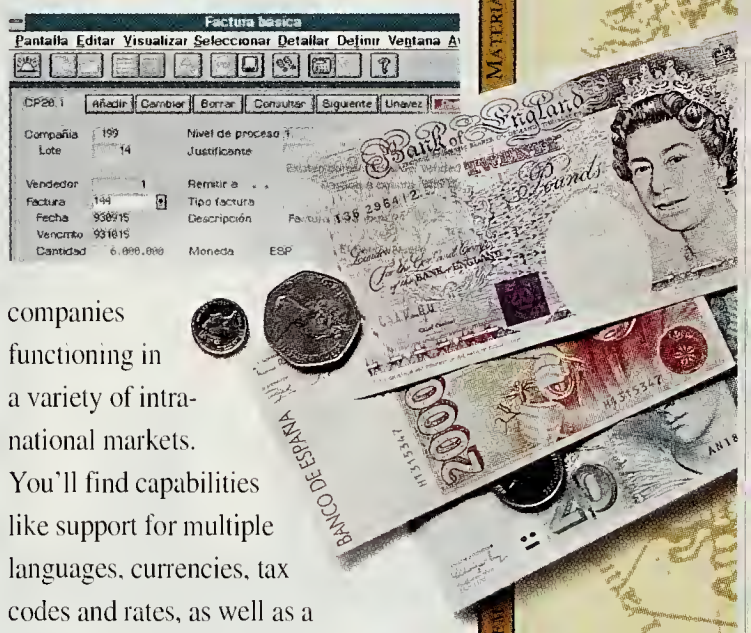

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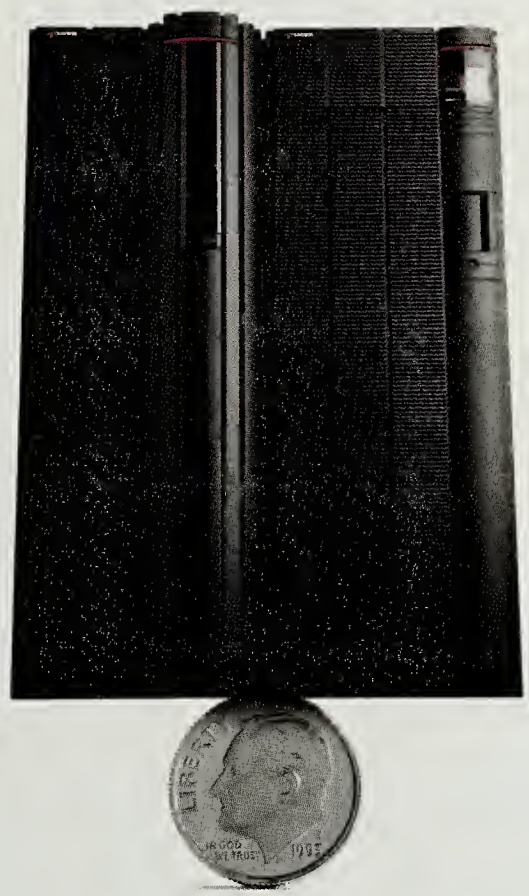

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PACIFICARE PICKS UP THE PIECES

CLIENT/SERVER Rx COULD LEAD TO BETTER CARE FOR HMO'S CRITICAL SYSTEMS

BY KIM S. NASH

"Managerially challenged" is how IS executive Leo Collins tactfully describes PacifiCare Health Systems, Inc.'s first go-round with building client/server systems.

The Cypress, Calif.-based health maintenance organization (HMO) set out to replace existing host/terminal-style Sales and Marketing (SAM) systems with a graphical, distributed-logic set of applications about two years ago. Digital Equipment Corp. VAXclusters had been good to PacifiCare for more than a decade, but now end users needed to query databases and massage data in ways that green-on-black dumb terminals prohibited.

While the $2.2 billion HMO fully intends to press on with client/server work, the experience so far has been a rude shock. Take the time during a test run of a client/server version of SAM applications when an existing TCP/IP network linking several dozen PCs to a VAX host cramped up under an unexpectedly heavy load of end-user database queries.

"Networks are a big variable in building client/server that perhaps we needed to consider more closely during [application] development than we did," said Collins, 42, who is the HMO's director of applied technology and information architecture. ▶

PHOTOGRAPHY BY ALAN LEVENSON

PACIFICARE'S Marianne Probst, Leo Collins and Joan Amico (from left to right) have a much better understanding of client/server's trials and tribulations

NO PAIN, NO GAIN

PacifiCare managers are eager to spell out warnings to fellow client/server virgins:

• Find other IS shops tackling similar client/server projects and talk their ears off. Learning from others' mistakes would have saved PacifiCare time in a couple of areas, according to Scott Brummett, director of business operating systems at PacifiCare of California. If the HMO had talked with people using the same products, the firm might have been able to skirt at least some networking and software compatibility problems, he said.

PacifiCare

• Set consultants straight. A big caveat at PacifiCare has for other IS groups in using consultants for a new project, whether or not the work is client/server, is to make sure the outsiders actually teach your internal staff. "It didn't occur to us that the consultants wouldn't teach our people what they were doing," Brummett said. The lack of training hurt PacifiCare when the consulting contract expired. "Once the consultants walk out the door, so does your expertise," he warned.

• Know that middleware "will make or break an application," said Leo Collins, director of applied technology and information architecture. Middleware can be especially nettlesome if IS is taking a gradual approach to client/server, preserving legacy hosts. Be sure to test products before buying them or risk getting stuck with links that strain under heavy data traffic or go down because of incompatibilities. Finding the middleware that works with your network, hardware and software combination "is tricky," he said.

• Carefully train IS workers in Windows and other PC technology. Once an application is in user hands, the IS help desk will be inundated, Collins said. "It's no good to have your help desk staff learning along with users."

Continued from page 42

That is because Microsoft Corp.'s Visual Basic, the most widely used client/server development tool at PacifiCare, has few guidelines on how to construct a system around different network protocols, he said. "We envisioned PCs and PC reporting tools on everyone's desks so that people could look at information in just the way they wanted to see it instead of [in] rigid, predefined reports," Collins recalled.

The vision also made room for PacifiCare's giant, though capacity-constrained, VAXcluster — said to be the largest in the world at 400G bytes — which the HMO could not scrap. "We have tens of millions of dollars invested in that cluster," Collins said.

A lack of client/server know-how among PacifiCare's 230-member information systems staff was the biggest drag on SAM, said Scott Brummett, 33, director of business operating systems at the operating division of PacifiCare of California. His unit is where most of the client/server projects are being put to work.

"Learning as you go gets real expensive and sets you up for many false starts," said Brummett, who heads the HMO's committee overseeing technology spending. "A good deal of SAM's costs went to paying for a learning curve that was much steeper than we imagined."

Retraining approximately 20 programmers adept at creating monolithic software for the VAXcluster took several weeks longer than anticipated, Brummett said. Training ultimately took on several forms: daily, hands-on work; a series of classes with instruction; and, finally, unidentified outside consultants.

Overall, education ate up the largest chunk of money PacifiCare has spent on client/server, according to Collins. More than half of an estimated 200% cost overrun of initial spending projections went to teaching developers how to use graphical tools and showing end users how to use PCs, Brummett added.

Whereas Brummett makes no bones about client/server difficulties, Collins is more circumspect. The two work well together, setting up projects as a team. PacifiCare is beginning to function that way more often, with technologists and business managers making plans that are more in sync with each other's priorities than in years past, Collins said.

Such coordination was needed for PacifiCare to revamp SAM — and quickly. A graphical, client/server SAM application set would accommodate more data and let marketing and sales users perform more flexible and intricate queries. While old SAM provided ugly, predefined reports on green and white computer paper, new SAM would let users compose queries of their own, as business conditions dictated, Collins explained.

Plus, new sales programs that marketeers wanted to try would have been impossible under the existing system, he said. For example, salespeople arrange seminars at local Denny's diners to tell senior citizens about the insurance and medical programs PacifiCare offers. Old SAM provided no application to track meeting schedules or outcomes.

Moreover, like other HMOs, PacifiCare is feeling the convergence of several factors that are forcing it to change the way it does business and the systems that make it happen:

- President Clinton and other politicos are pushing plans to build unified, integrated health networks across the U.S.
- Shifting competitive advantage means companies must now collect more data than ever before and manipulate the information in new ways.
- PacifiCare's VAXs, which connect a network of PCs and terminals across six states, have hit a capacity ceiling, with the amount of data on the system doubling twice in the past year as IS operations at several acquired firms were folded into the cluster.

Neither Brummett nor Collins would specify how much money has

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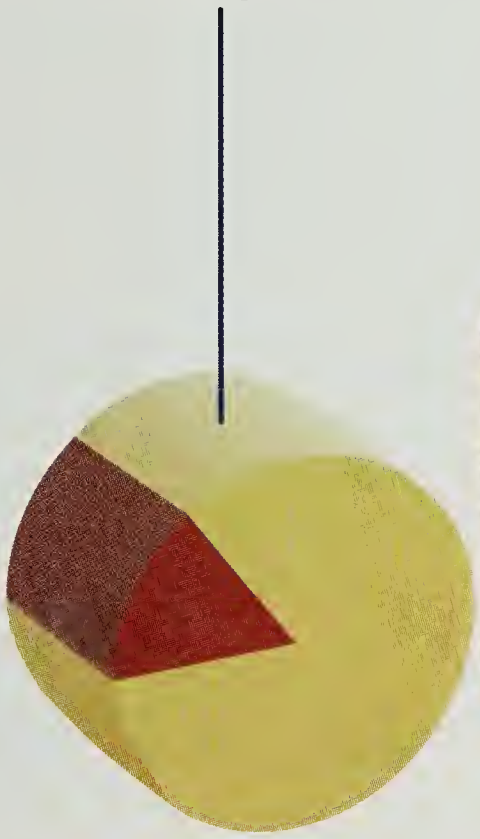
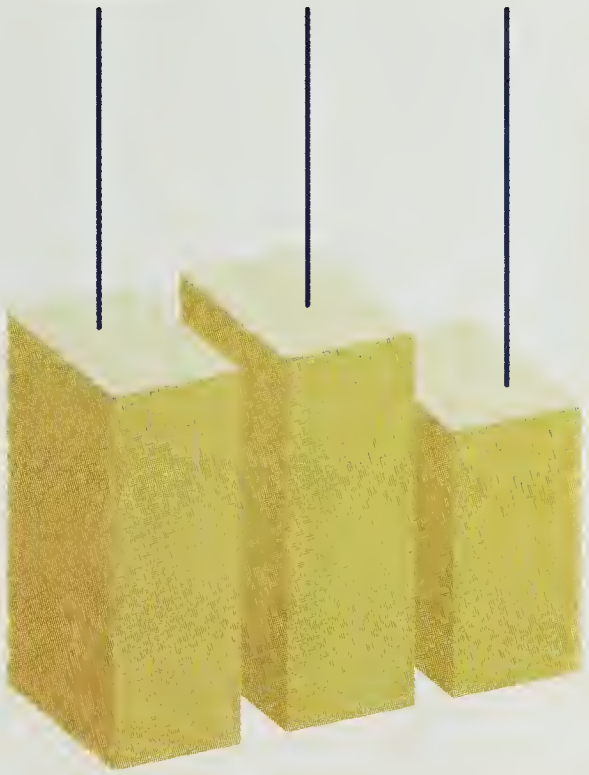


. . . DOLLARS WILL BE SPENT UPGRADING INFRASTRUCTURE . . .

24% Implementing upgraded network backbone

24% Incorporating multimedia capabilities

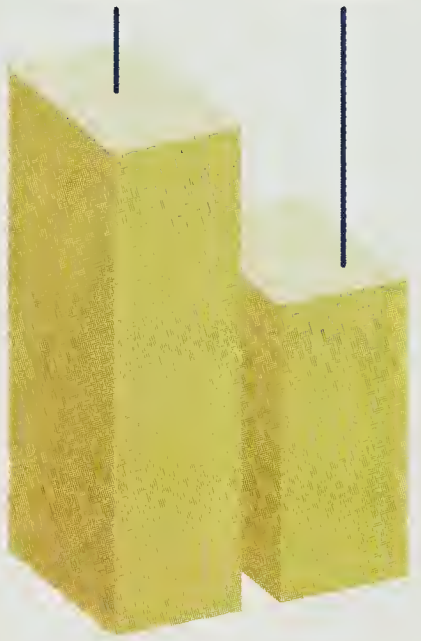
17% Widening available applications



. . . TO MORE TIGHTLY INTEGRATE DISPARATE SITES

31% Linking systems across separate facilities

19% Implementing computer-based patient record systems



been spent on SAM and another significant client/server effort, a system to help PacifiCare manage MediCal/Medicaid insurance enrollment. However, software development costs alone topped $7 million in 1993, according to PacifiCare's most recent annual report. That is up 14% over 1992's $6.2 million, which itself was a 36% jump over the $4.5 million spent in 1991, the report stated.

Maintenance for PacifiCare's virtually all internally built software also racked up high costs, which further motivated the company to redesign its infrastructure, Collins said. Users "can see that if our in-house-written apps were integrated with shrink-wrapped stuff, they'd have more powerful business tools," he added. "But you don't find shrink-wrap for the VAX. For that, you have to use PCs."

Brummett and other business managers talked about abandoning client/server when SAM was at least a year over schedule and way over budget. But the firm pressed on, partly because "we didn't have any alternatives in mind," Brummett said.

Surprise about cost overruns might have been avoided if the SAM project had been more closely analyzed up front, Brummett said. As it was, SAM proponents did not have to cost-justify their proposal to upper management, he said, because the existing SAM sorely needed replacing.

But SAM persevered. Phase one — applications to manage the new marketing schemes — was delivered in January to 10 users, Collins said. The application went live for an additional 100 users last month, a fraction of the several hundred sales and marketing staffers PacifiCare hopes to upgrade in the next 12 to 18 months.

Phase two calls for a combination of in-house-built and off-the-shelf sales management software to track leads and contracts for telemarketers and field salespeople. Development continues, but no deployment date has been set.

"We may call time out after [full implementation of phase one] to take

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Continued from page 45
stock and reassess," Brummett said.

Fundamentally, the HMO practices sophisticated IS according to measures used by fancy management consultants. For example, networks cut across state lines to link patient and hospital information about residents of Oregon and Washington, and workers at an HMO in Florida zap files daily between Miami and PacifiCare headquarters.

To stay one step ahead of pending health care reform, many HMOs see the need to think on their technology toes. But the bulk of those firms adopting client/server are doing it only in dribs and drabs, according to Jay Toole, national director of health care IS consulting at Ernst & Young in Atlanta.

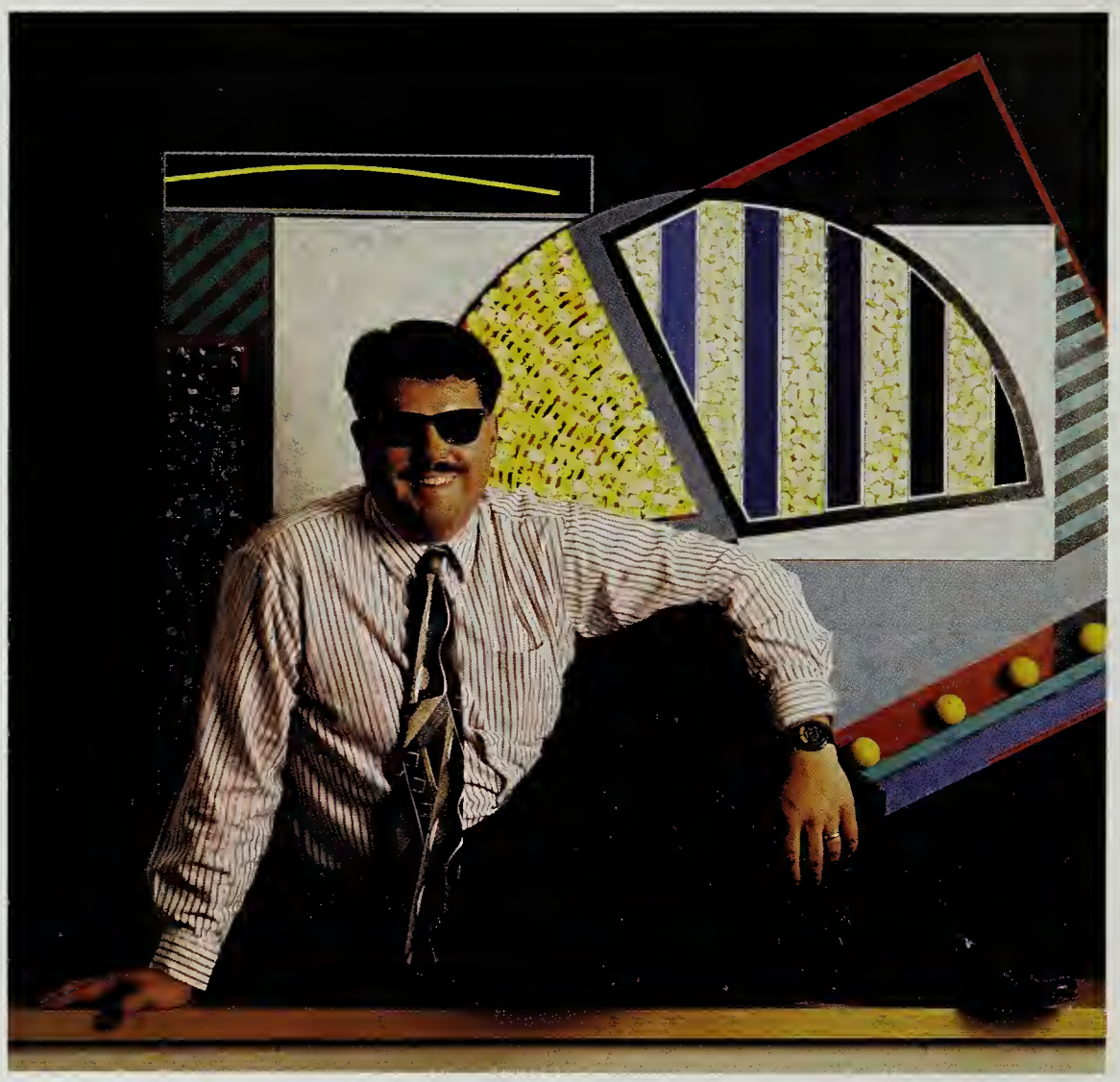
So PacifiCare is ahead of the game despite its setbacks.

"What's happening at PacifiCare is probably pretty normal," Toole said. Much of the company's pain during its transition to a new computing architecture is a result of having "gone after client/server big time," he explained. "But that's the only way to do it if you want to be ahead of your competition two years from now."

Except for incremental gains in SAM applications, the company has yet to see much measurable payback (i.e., dollars saved on software development or additional revenue). That is primarily because the project has not been completed, Brummett said. The HMO still expects to reap benefits in two or three years, he added.

In the meantime, PacifiCare can delve into its middleware puzzle. Middleware — software gateways that usher and translate data and queries between PC front-end tools and database servers — became a heavy manacle on the HMO's client/server efforts, Collins said.

PacifiCare bought Open Database Connectivity gateways to link Microsoft's SQL Server for Windows NT database and Sybase, Inc.'s SQL Server to Digital's Rdb database. But configuring middleware is more complicated than a first-blush evaluation would suggest, Collins said.



PACIFICARE'S SCOTT BRUMMETT traces the HMO's client/server surprises to a pioneer's naivete

Given some of the lessons about training and middleware that had begun to emerge with SAM, PacifiCare's next client/server project for managing enrollment to MediCal/Medicaid insurance has gone more smoothly. Funded by federal and state governments, Medicaid programs insure people who are unable to pay their own medical expenses. MediCal is a similar service for California residents.

The MediCal/Medicaid system uses Digital's ACMS/Desktop middleware to enable PCs to query a VAX database, for example, while printing reports in background mode. Before, users would have had to perform one task at a time. PacifiCare is happy with the application because it was built in just about three months and in tests does not bog down networks.

While health care reform talk continues, PacifiCare is evaluating its technology hand. Collins, Brummett and other managers want to meet with developers, network administrators and business executives to do a postmortem on client/server. Brummett said he is hard-pressed to OK another client/server undertaking unless certain items, such as training and consulting, have onetime fees.

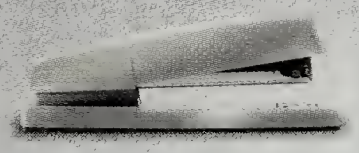
Work on SAM will no doubt continue, but not as feverishly as it started, Brummett said. PacifiCare ultimately plans to put SAM on Intel Corp.-based servers running Novell, Inc.'s NetWare or Microsoft's Windows NT, Collins said. Core transaction processing will be assigned to Digital Alpha-based machines next year.

Meanwhile, MediCal/Medicaid went live last month. The application had sat for nearly three months while various government agencies inspected PacifiCare's proposal for compliance to state and federal laws.

"We're all practically giddy about going into production," Collins said. "Now we get to measure our work to see if it all lives up to promise." ◩

Nash is a Computerworld *West Coast senior correspondent.*

PHOTOGRAPHY BY ALAN LEVENSON



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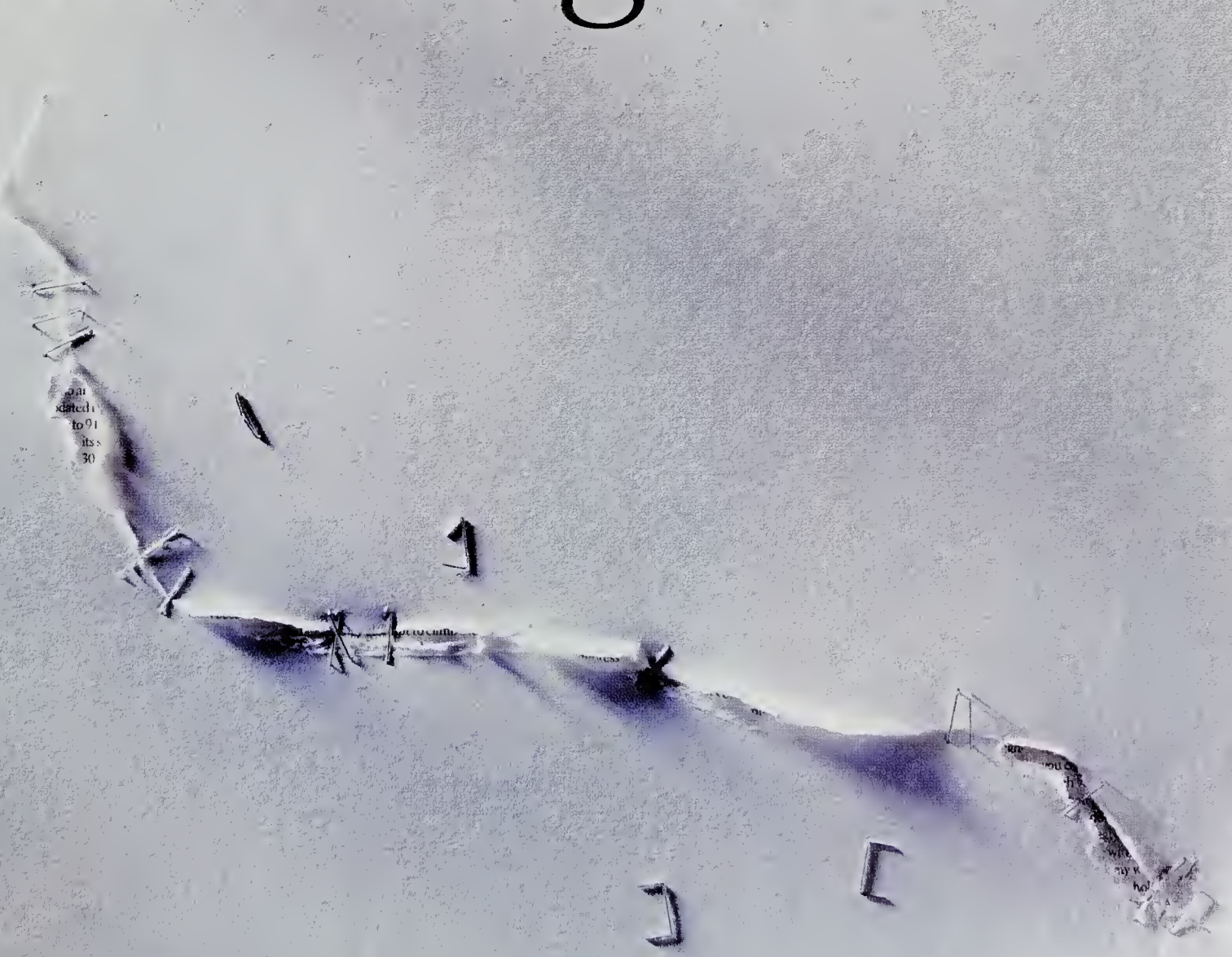

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Individualized and multipoint-to-multipoint desktop videoconferencing among physicians and residents will become more cost-effective in the next 12 to 18 months, some analysts said. Bare-bones systems could well be priced in the $2,000 range by that time, noted Robert Aston, president of Santa Cruz, Calif., research firm Market Vision. He pointed to recently unveiled low-cost Silicon Graphics, Inc. workstations and Intel Corp. videoconferencing gear, as well as expected improvements in LCD and video compression technologies.

But for multimedia medicine to have a major impact, networking technologies such as Asynchronous Transfer Mode (ATM) — which supports blazingly fast image, voice and data transmission — and Integrated

Please turn to page 54

BY CHRISTINE PEREY

PHOTOGRAPHY BY ALVIS UPITIS

The Client/Server Solu

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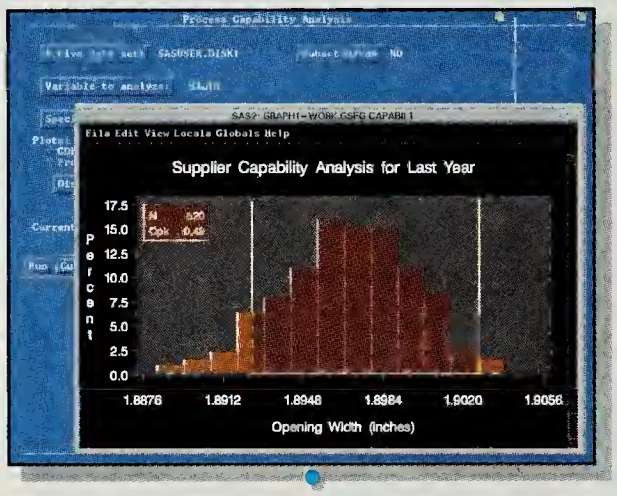

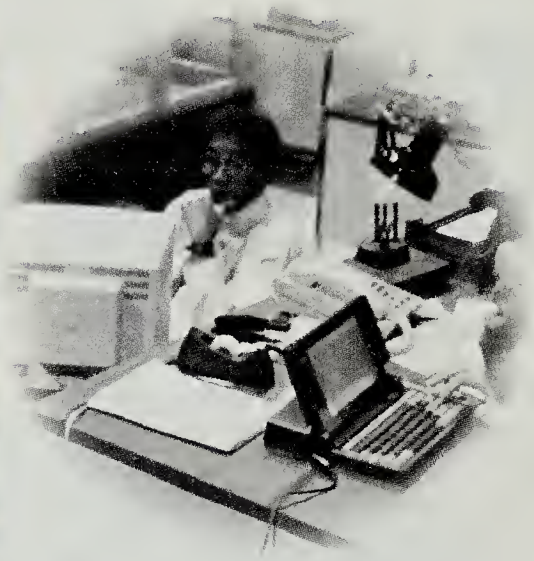

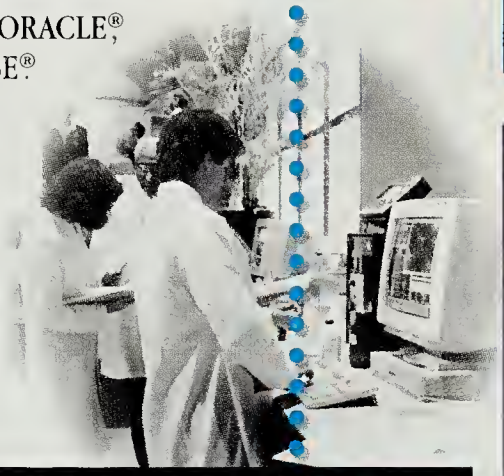

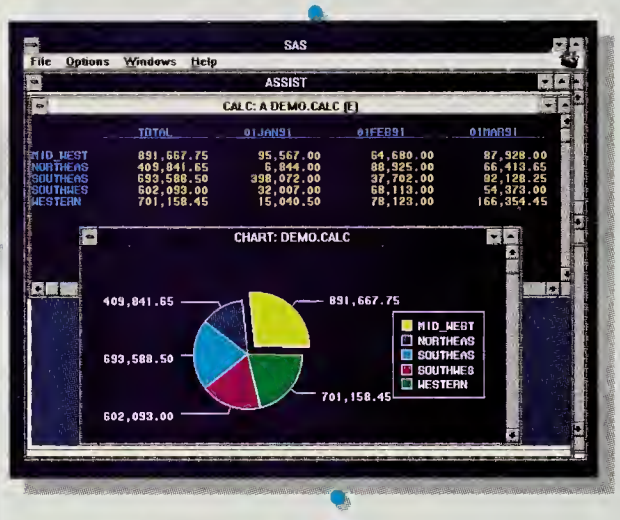

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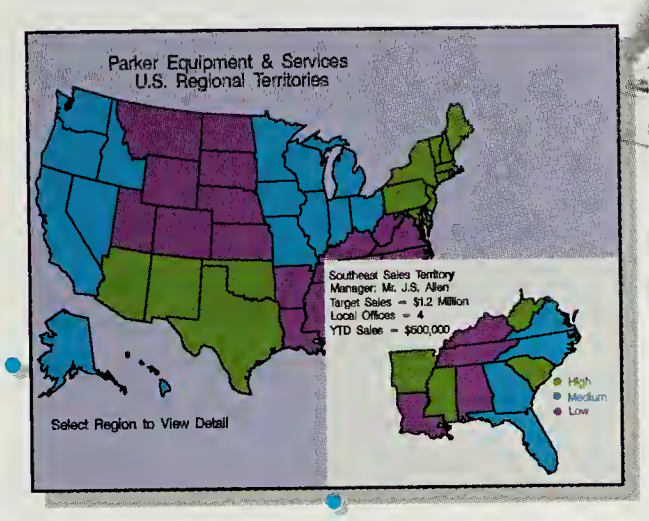

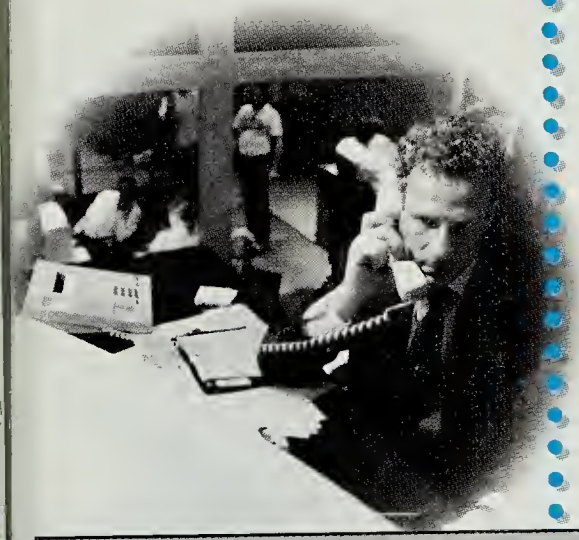

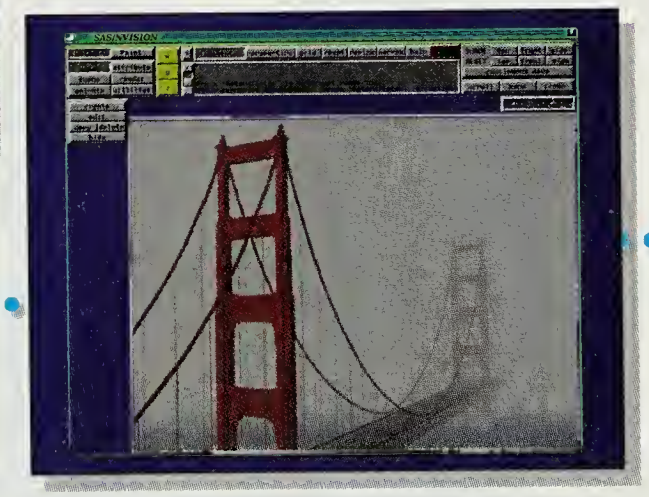

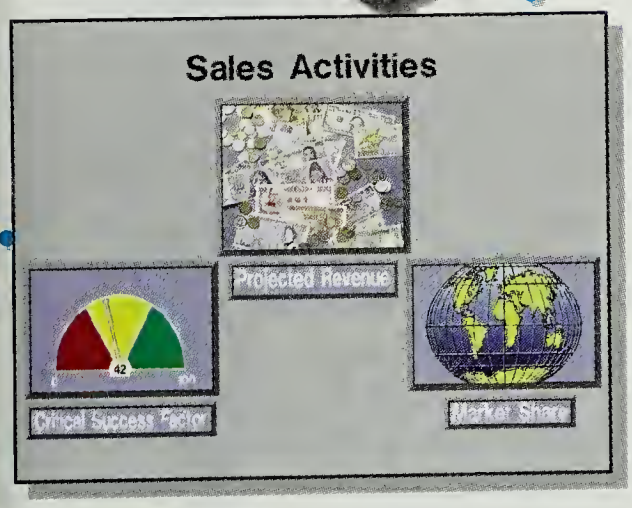

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ormation Delivery

Continued from page 51
Services Digital Network (ISDN) will need additional incubation.

With a gleam in his eye, Dr. John Gosbee, M.D., director at Michigan State University's Center for Applied Medical Informatics at Kalamazoo, said he hopes to push the multimedia medicine envelope.

Gosbee already helped his institution build a network last November to enable physicians and residents to share vital patient care data dispersed across six regional campuses around the state. The network uses a PictureTel Corp. videoconferencing system that relies on ISDN or other inexpensive dial-up services, Gosbee said.

Now, Gosbee and his team are evaluating desktop computer-based videoconferencing applications to run over the university's LANs and wide-area networks. The network has incredible possibilities: "When general physicians can consult or even collaborate on the screen with a specialist by circling an affected area, zooming in or out or palpating an area for diagnosis, the patient may be spared unnecessary costs or discomfort caused by moving between facilities. In the best-case scenario, a treatment may be identified during a videoconference," Gosbee postulated.

MULTITIER NETWORKS such as Oregon's Rodeo Net let health care students complete course material from home rather than commuting

REDUCING TRAVEL TIME

Multimedia medicine is also being practiced at the University of Minnesota Department of Radiology. At 7:00 a.m. each day, radiology residents at three hospitals are expected to gather for one hour in a lecture hall to continue their didactic learning. Getting everyone in the same room, however, was becoming very difficult, given patient rounds and congested roads and parking lots in the Minneapolis area.

Creating a high-speed videoconferencing network using an ATM backbone would allow residents to continue their education from remote sites. That's why the department queued up when it heard that US West was testing ATM.

"Our challenge was to create an environment in which there was no travel time for either the physicians or the residents and virtually no learning curve for either," recalled Dr. Marvin Goldberg, a driving force behind the project.

US West designed a videoconferencing system that connects to the hospitals' Fiber Distributed Data Interface LANs (see box at left). Multiple roaming cameras in each facility allow faculty members to walk around the classroom while maintaining visual contact with their audiences. An electronic whiteboard lets students and faculty make additional handwritten notes. Visual aids that accompany the lecture's digitized diagnostic images appear on screens in real time at multiple sites.

Despite its lofty goals, health care organizations delving into multimedia medicine should tread carefully, experts say. One reason: Interfacility applications will have to wait until fiber-optic networks and ATM switches are perfected and widely deployed later in the decade. ◩

Perey is a free-lance technology and multimedia writer based in Placerville, Calif.

NETWORK NIRVANA

Faculty members and 50 residents at the University of Minnesota's Department of Radiology are using real-time digitization and transmission of high-quality images to simulate a classroom environment for residents rotating among three hospitals in the Minneapolis/St. Paul area.

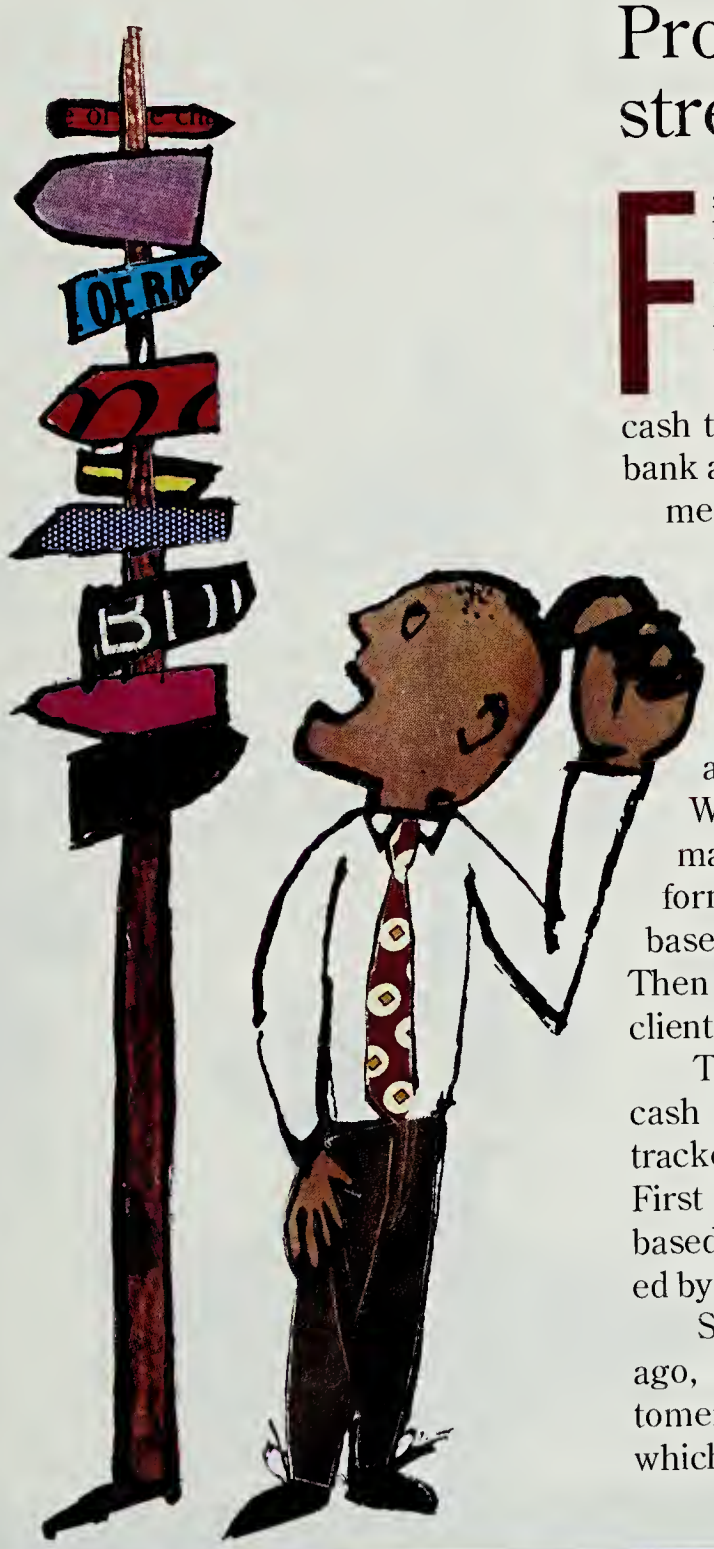
Funding: Due to the prototypical nature of the network (a US West trial testing AT&T, Fujitsu Ltd. and Siemens Stromberg-Carlson ATM gear), its costs are not "market-based" but are reported to be in the vicinity of several hundred thousand dollars over two years.

Institutions and facilities: Distributed among the University Hospital in Minneapolis, Veterans Administration Medical Center, six miles away, and Hennepin County Medical Center, two miles away.

The network: Both digitized diagnostic imaging and two-way audio and video traffic travel over a fiber-optic network capable of 155M bit/sec., controlled by ATM switches in the US West central offices. Facilities in each institution support remote viewers that see the speaker and vice versa; remote pointers, or "air mice," that the speaker uses to highlight areas of interest on 35mm slides; X-ray viewing from view boxes; chalkboards; and overhead projectors.

The customer comes FIRST

Proactive systems point users toward streamlined service, quick responses



Finance department staffers at Bridgestone Firestone, Inc. in Nashville used to log several hours a week ordering, tracking and confirming electronic cash transfers between a New York bank and the tire manufacturer's domestic and foreign suppliers.

At Ameritrade, an Omaha brokerage firm, dividend analyst Valerie Ackman used to take more than two weeks to answer clients' questions about account discrepancies. When a request came in, Ackman would submit a 7-ply paper form to Ameritrade's Chicago-based securities processing firm. Then she would wait. So would her client.

Today, Bridgestone Firestone's cash transfers are initiated and tracked on an in-house PC linked to First Window 2000, a client/server-based funds payment system operated by First National Bank of Chicago.

Since its inception 18 months ago, more than 150 corporate customers have signed onto the system, which enables companies to prepare, schedule, execute and monitor cash transfers and other transactions from a single client workstation on-site.

Ackman also now taps into a client/server customer inquiry application recently brought up by Midwest Securities Trust Corp. Known as Communique, the system lets brokerages directly query an Informix Software, Inc.-based customer inquiry database at Midwest and in turn furnish investors with fast, accurate answers.

"Now there's no paper involved. It's a lot less work because you just go to the system, and anything you need is right there," Ackman said.

IMPROVED CUSTOMER SERVICE

There's no question that information technology — particularly client/server technology — is radically changing the way companies deliver customer service. Banking and financial services customers have instant access to account information.

In retailing, suppliers with access to store inventories automatically restock the shelves at Wal-Mart Stores, Inc. and Kmart Corp. out- ▶

BY JULIA KING

ILLUSTRATION BY SCOTT MENCHIN

Continued from page 55
lets nationwide. With a few keystrokes on a PC, consumers can register for health care services, check bank account balances and schedule and pay for a trip around the world.

The key advantage client/server technology offers over more traditional, mainframe-based systems is the ability for customer service departments — and, in an increasing number of cases, customers themselves — to directly access information and applications via easy-to-use graphical interfaces.

Distributing data and computing power also helps minimize full-blown system failures because data can be routed around faulty components. This is especially critical for 24-hour customer service applications, such as hotel reservation and catalog ordering systems.

Still, early implementers caution that client/server technology is not an instant cure-all for customer service woes. Among other things, vendors have yet to come up with systems robust enough to handle large volumes of transactions with an acceptable degree of reliability. Also, users report that existing off-the-shelf software is, at best, immature.

"The biggest challenge with any client/server system is that you're working in an uncertain environment," said Bill Anderson, chief information officer at Prudential Securities, Inc., which next month will complete its second-generation rollout of 265 branch offices to a client/server-based customer information system that is built around IBM RS/6000 Unix servers, Sybase, Inc. databases and 486-based PCs running OS/2.

"All of the new workstation and server software is by definition functionally very rich but less stable than MVS or VMS," Anderson noted.

Despite these problems, Anderson figures the branch information system will save $5 million annually, largely from lower market data bills and reduced equipment maintenance costs. "In terms of customer service benefits, we can handle inquiries about 35% faster," he noted.

So-called front-end change management issues, however, are much more complex than client/server hardware issues, according to Brian Madden, an analyst at CSC Consulting Group. "The larger issues are how people are managed, changing the way people work and reorganizing people's behavior."

Perhaps. But for now, it's the technical issues that are of the most concern to managers such as Dixie

Sommers, who is deputy administrator at the Ohio Bureau of Employment. Last year, the bureau began converting to a client/server information system, installing 1,300 Windows-based PCs at 76 employment offices statewide. These are linked to a Unisys Corp. Unix mainframe over a Novell, Inc. NetWare 4.01 LAN.

"It's scary being on the bleeding edge," said Sommers, whose agency will use the new system to support a program for matching some 600,000 registered unemployed workers with available jobs.

"Putting all of this stuff in has been a major challenge," she said.

At Midwest, John Dynkowski, manager of emerging technologies, said his thorniest technical problem was creating a connection between the new Unix-based customer inquiry tracking system, customers' SNA-based systems and Midwest's SNA-based core processing system. The problem was solved using proprietary protocol conversion software that resides on an IBM RISC platform at Midwest. At the customer end, users access the system via 3270-type terminals in a text-based format.

But there are dangers in accommodating such dual environments, noted Larry DeJarnett, head of A. T. Kearney, Inc.'s Chicago-based IT Center of Excellence. "If you're not very careful with evolutionary strategies for client/server, you could end up with a foot planted in both camps," he said. "It's cheaper and easier to do customer service systems if you're dealing with a green field because one of the difficulties of a client/server environment is how do you begin to uncouple customer service databases from the host?"

DREAMS BECOME REALITY

On the plus side, client/server-based customer service systems that work well offer a functionality users could only dream about a few years ago.

At Bridgestone Firestone, for instance, corporate cash manager Glenn Swann attributes a large part of his department's efficiency gains to First National Bank of Chicago's First Window 2000 system. "We used to phone in wire transfers to New York, then the bank would phone back to confirm them. . . . There was a lot of phone tag, and from an operations point of view, it was very difficult," Swann said.

Now, Bridgestone Firestone has direct access to several funds transfer networks, including the Federal Reserve, Automated Check Clearinghouse and an international payment network, all through the same PC-based application.

First National Bank of Chicago customers can also make state tax payments using First Window 2000, which contains tax tables that automatically calculate amounts due and the proper filing formats for all 50 states. Getting customers up and running is as straightforward as loading five prepackaged disks.

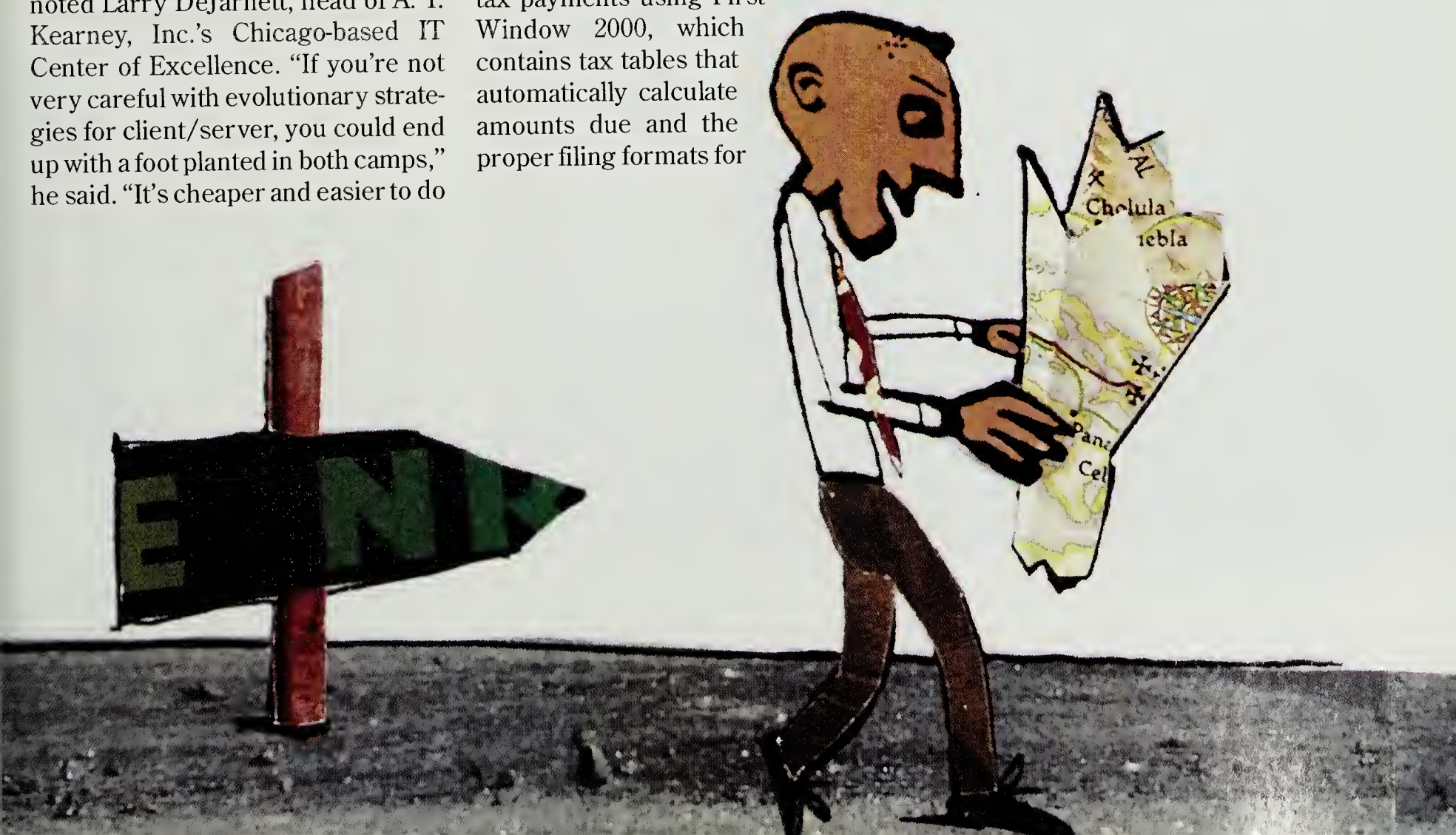
On the bank's end, however, getting the system up and running was anything but simple, according to Vice President Art Hill. It took 10 developers 18 months to develop the system's Windows-based interface.

To realize a healthy return on any customer service system, information technology departments must keep a trained eye on what impact that system will have on a company's top line, according to Doug Aldrich, head of A. T. Kearney's North American information technology practice.

Boosting that line entails first figuring out what drives a customer's need for your product, then furnishing the customer with the information and tools to get it, he said.

"Whether they're ordering a Barbie doll or a trainload of polypropelene, customers want to know three things: availability, deliverability and price," Aldrich noted. "What client/server offers is an easier and cheaper way than ever before to offer this." ◩

King is a Computerworld *senior editor, Management.*



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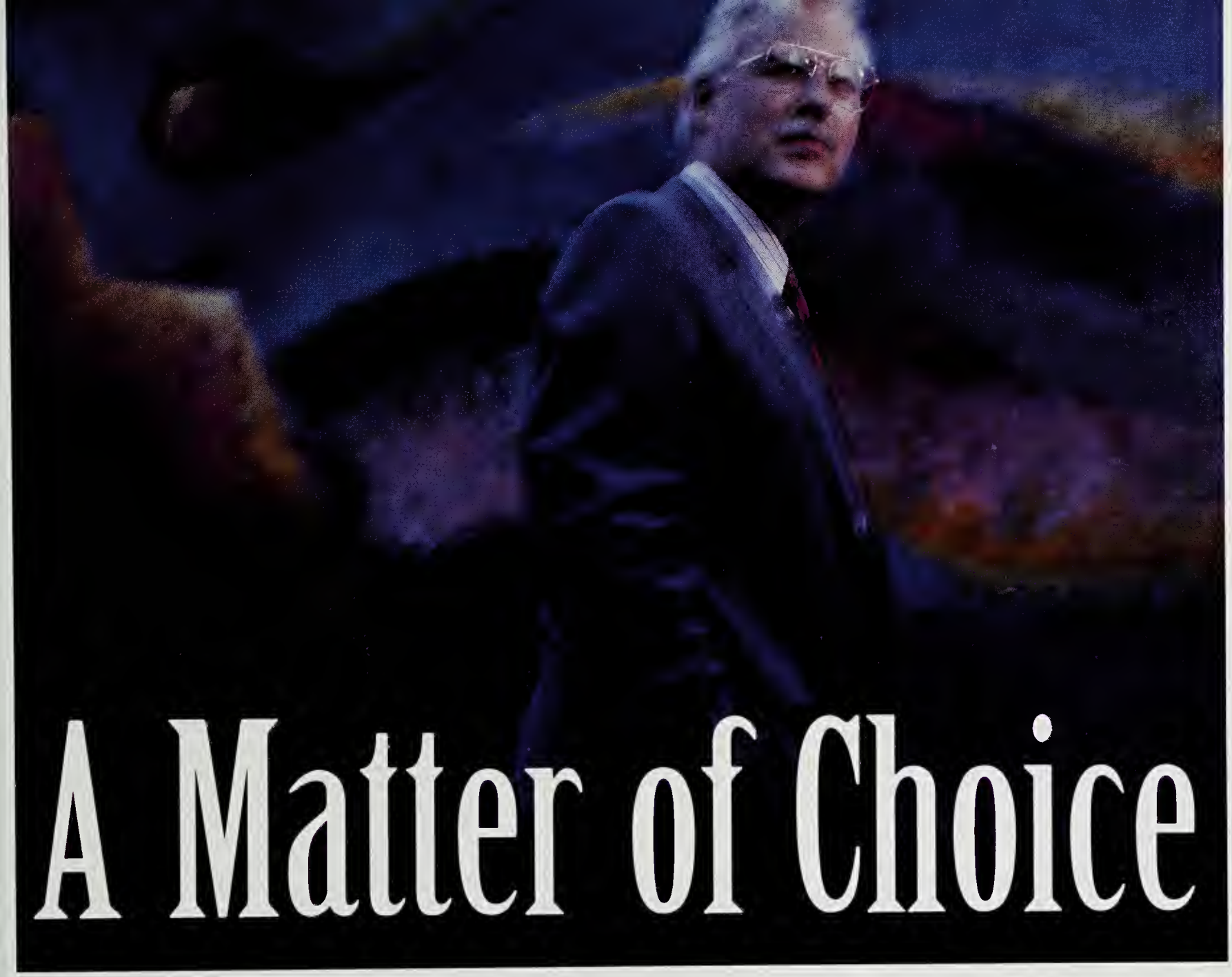

A Matter of Choice

OBJECT-ORIENTED AUTHOR Paul Harmon: 'OLE's CORBA compliance will come from a backdoor link to Digital's object request broker'

Charting an object-oriented course depends on what you want to do when

Object-oriented development holds the promise of achieving a loftier degree of client/server integration with objects that model the real world interacting across heterogeneous computing environments.

Such a prospect remains a possibility, but information systems managers today have little choice but to shoot for much less. For example, an object created in Borland International, Inc.'s C++ can't use a class library written in Microsoft Corp.'s C++ because no two C++ compilers are written the same way. An object created in any brand of C++ can't dispatch methods over the network to objects created in Smalltalk, Objective C or other languages without the intervention of a new piece of middleware: an object request broker.

OBJECT TECHNOLOGY

A new standard, the Common Object Request Broker Architecture, or CORBA, was created to neutralize language differences among objects, but so far it can't operate across different vendors' environments. CORBA compliance in IBM's object request broker, for example, has been implemented differently than CORBA compliance in Digital Equipment Corp.'s or Hewlett-Packard Co.'s object request brokers.

The Object Management Group (OMG) in Framingham, Mass., is hard at work creating a cross-platform standard, but it hasn't settled on what approach it will take or which of many competing technologies it will use. Nor is it clear how quickly the OMG vendors will fully implement the intricate standard once it emerges.

Objects stored on servers that interoperate across a network would be a development that synchronizes with the goals of client/server computing. But for now, early adopters should shoot for more limited goals, seeking to create a system that func-

Please turn to page 62

BY CHARLES BABCOCK

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Continued from page 59

tions across common platforms on a homogeneous network. And they will need to manage expectations such that they acknowledge that some of the benefits of object-oriented development, including portability of objects and reuse of code, are dependent on advances with CORBA and other developments.

Many of these reservations can be applied — only more so — to the emerging object-oriented environment represented by Microsoft's Object Linking and Embedding (OLE) 2.0 under Windows. OLE is a collection of technologies and C++ programming techniques that allows one Windows application to use objects in another. It was originally created to generate compound documents, and now Microsoft is adding custom controls and other tools to make OLE useful for more general purposes.

But OLE's CORBA compliance will come from a backdoor link to Digital's object request broker, and Digital — not Microsoft — is writing the interfaces, noted Paul Harmon, a San Francisco author on object-oriented subjects.

OLE 2.0 also appears to be slanted in favor of C++, although Microsoft spokespeople dispute the charge. For example, the virtual function tables automatically created by the compiler for a C++ object must be generated and initialized by the programmer if he is trying to call objects written in C or some other language. The tables, countered Microsoft's Vic Gundotra, OLE product manager, "can be coded by a kid in college in the first semester of C programming."

In addition, Microsoft has implemented inheritance in a way that does not conform to the object-oriented experts definition. Inheritance allows subclasses of objects to inherit the characteristics of related classes back to a base class. Under OLE, however, the programmer substitutes or "aggregates" pointers — specific references to the object interface elsewhere in the class — so no searching is done. Under aggregation, as Microsoft calls it, the pointers avoid the confusion that may occur when different programmers make erroneous assumptions about the base

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Banking on

When Mark Frutig arrived at First National Bank of Chicago in 1992, his mandate as newly appointed vice president of technologies and development was to move the firm's securities departments to a client/server environment via object-oriented methodologies.

OBJECT TECHNOLOGY

The bank had already selected Next's NextStep as the environment for its object-oriented development. It chose NextStep for its speed in generating code, combined with its easy screen-painting and interface capabilities in a client/server setup, Frutig recalled.

Today, First National Bank of Chicago traders rely on an object-oriented system running on Next workstations connected to Sun servers and a Sun-based office system to handle all trade clearance functions. The data is then passed on to the mainframe for back-office applications.

The benefits of object-oriented development are easy to see, Frutig said, pointing to increased productivity of the bank's traders using its Repo front-end system, though he declined to be specific.

The previous system had eight traders manually writing tickets, with a runner to move the information. "Everyone was working off yellow legal pads and calculators," Frutig said. "Today, the [client/server] system has automated portfolio history and collateral information, which al-

Objects

BY SALLY CUSACK

lows traders to concentrate on their portfolios instead of ticket writing," he explained.

Driven by need and supported by deep pockets, banking and financial traders are willing to lead in the "no pain, no gain" world of object development, according to Tom Love, vice president at the IBM Consulting Group in White Plains, N.Y. "These institutions believe they are going to get a 20-to-1 increase in productivity the first 24 months out," Love said. "Right now, the numbers are in the 5-to-1 range, and that in itself justifies any imagined expense."

Matt Meinel, executive director of information technology at Swiss Bank Corp., said he believes that to achieve such lofty productivity goals, business objectives must match the object-oriented development process.

Swiss Bank views object oriented as "part and parcel of our whole move to open systems," Meinel said.

Over the last few years, Swiss Bank has built a global network comprised of both Sun and Next systems for financial transaction processing in a TCP/IP Network File System environment servicing more than 2,500 end users. All graphical user interfaces are built using object-oriented technologies.

Despite this success, Swiss Bank has not been spared its share of developmental blood.

"The biggest problem is dealing with remote objects," Meinel said. Vendors, he added, never quite have what you need to make it simple.

His solution? "The 'state of the state' today is that we build objects using Next's Portable Distributed Objects [PDO], which allows you to develop functionality in an object without regard to whether it will run on a server. It also allows you to test everything locally."

Things are changing so rapidly in object oriented that developers are constantly porting, Meinel pointed out. One C++ system built in 1987 was moved to NextStep in 1990. Still searching for more functionality, the company decided on Next's now-available PDO.

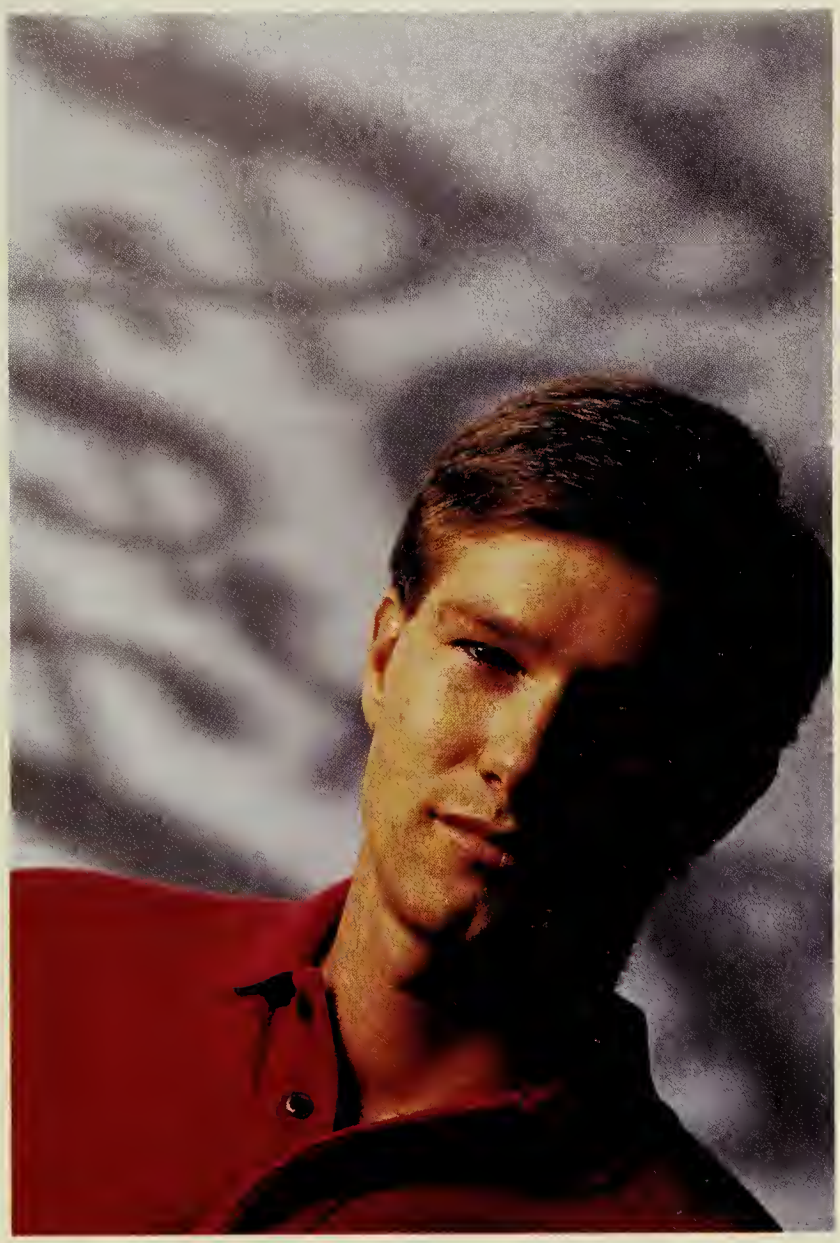
One of the main problems with C++ development is leveraging code for reusability, First National Bank's Frutig said. "We had to look at the business model itself to solve this problem. Once we determined that all these financial securities instruments are just different ways of handling cash flows, we broke down the representation to just deal with flows."

After that, Frutig said, it was easy to structure the objects representing the instruments. "The neatest thing we have been able to do is design a consistent tree of instruments, which all inherit functionality downward," he added. "This means little modification is needed when introducing a new financial security model."

Another area in which designers should tread cautiously is library dependencies, Meinel warned. There are more library dependencies in object-oriented than in procedural development, and staffers must be committed to tracking source code to offset problems. Hence, Swiss Bank has source-code control systems that span the entire development group.

Meinel said he believes the learning pains of object-oriented client/server development are worth enduring, as long as "you have a really rich object library and a group of highly skilled people. We move every step of the way looking at our business. We can have relatively small development with big paybacks." ◩

Cusack is a free-lance writer in Marstons Mills, Mass.



SWISS BANK'S MATT MEINEL (ABOVE) AND FIRST NATIONAL BANK OF CHICAGO'S MARK FRUTIG (AT LEFT) ENDURED THE PAIN OF MOVING TO OBJECTS AND ARE STARTING TO REAP ITS REWARDS

PHOTOGRAPHY: AT LEFT, DAVID JOEL; TOP, DOUGLAS JOHNS

Continued from page 62
class characteristics, Gundotra said.

By switching to aggregation, "Microsoft has broken one of the most important features of object-oriented programming," said Richard Solely, technical director of the OMG, which includes IBM, Sun Microsystems, Inc., HP and Digital.

By way of contrast, objects created with Next Computer, Inc.'s NextStep do not require pointers because the object classes automatically form a chain of inheritance that is searched by another object seeking a particular operation. The message seeking the operation can search through successive classes from which the object has inherited its characteristics until it finds the operation. Inheritance, as the object-oriented experts define it, is what makes objects easily modifiable and reusable.

NextStep, while offering an elegant user interface, is written in Objective C, an object-oriented language that attempted to combine the best elements of C and Smalltalk. It never caught on except among customers of NextStep, while C++, the basic C language with object-oriented extensions, has grown dramatically.

So if you are setting off toward the brave new world of objects, heed this warning: Objects, especially distributed objects, may be further off than they appear.

"Consider distributed objects as something that's coming, but don't bank on it. It's going to take some time," warned David Moskowitz, an object-oriented writer and consultant in Norristown, Pa.

On the other hand, user experience is leading to rapid progress in object-oriented methodologies such as Grady Booch's Object Oriented Design or Allen Wirfs-Brock's Responsibility Driven Design. In many cases, one of the first choices an IS manager faces moving into object-oriented development is which methodology to urge developers to adopt companywide.

A decision that follows is choosing languages and tools to support it. Traditional computer-aided software engineering vendors such as Interactive Development Environments in San Francisco and Cadre Technologies, Inc. in Providence, R.I., have redone their front-end tools to support particular object-oriented environments, linking their end results to code generators.

SUN'S RICK CATTELL: Not using an OO DBMS is like putting a Volkswagen engine in a sports car

Interactive Development Environments, Intellicorp and other vendors integrate legacy data modeling and procedural language tools with object modeling tools, thanks to an underlying repository. But customers seeking to take advantage of the integration must remember that the end result may support just one of the methodologies. Interactive Development Environments, for example, has chosen to support one object-oriented methodology — the Rumbaugh Object Modeling Technique — and the C++ language.

Another question for object-oriented tools vendors is whether they can supply version control. Developers working on an object system in a group will need to know they are dealing with the version of objects intended by fellow developers. With different developers likely to be working on parts of client/server systems for different environments, version control is critical.

Not all tools have a repository or object-oriented database management system. While complex data can be reduced to its constituent data types and stored in relational databases, object-oriented development tends to require an object-oriented DBMS. Not including one "is like going from a Volkswagen to a sports car but insisting on keeping the old engine," said Rick Cattell, a distinguished engineer at Sun and author of the book *Object Data Management*.

The purest object-oriented language in use today is Smalltalk from Digitalk, Inc. in Santa Ana, Calif., or ParcPlace Systems, Inc. in Palo Alto,

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Depends on Your Objectives

	MICROSOFT OLE 2.0	APPLE/IBM/WORDPERFECT OPENDOC	NEXTSTEP
INHERITANCE	Simulated by aggregation	Supported by SOM/DSOM*	Supported by NextStep
LANGUAGE	C++ bias. Support for other languages.	Language-neutral	Objective C, C++, C
DISTRIBUTED	Windows, Windows NT, Mac. Unix planned.	Mac, OS/2, Windows and Unix (with DSOM)	Windows; Solaris, HP/UX planned
AVAILABILITY	For programmers since May '93. Applications shipping.	For programmers in Q3 '94. No applications shipping.	For programmers, users since '89
MANUFACTURER'S TOOLS	Visual-based tools, custom controls	None announced, several under development	Integrated, cross-platform tool set
THIRD-PARTY TOOLS	Many third-party tools available	Borland, other third-party tools planned	Few available
OPENNESS	Controlled by Microsoft	Assembled by Component Integration Labs	Controlled by Next; APIs to be published

*System Object Model/Distributed System Object Model by IBM

Continued from page 64

Calif., but it has fewer users than the rapidly growing C++.

Object-oriented Cobol will be a newcomer on the scene when Microfocus, Inc. introduces the first version of the language this fall. Like C++, object-oriented Cobol will be the standard language with object extensions, and a whole new set of programmers may find their way to object-oriented development along its familiar path.

Painstaking though it is to turn Cobol programmers into object-oriented experts, the transition is necessary. That is because most experts believe client/server systems will be easier to design and build with objects — given their ability to send and receive messages across a network — than third-generation languages.

Some C programmers may also have a problem making the transition. "Bit twiddlers used to C as a disguised form of assembler are going to have a problem, too," said Moskowitz, who urges firms to bring in outside training to change their development cultures before moving to an object-oriented approach.

Nevertheless, both C++ and object-oriented Cobol can extend skills that already exist in IS shops. In addition, Digitalk offers a Cobol Wrapper and CICS Wrapper to move chunks of legacy code into the object-oriented world under OS/2.

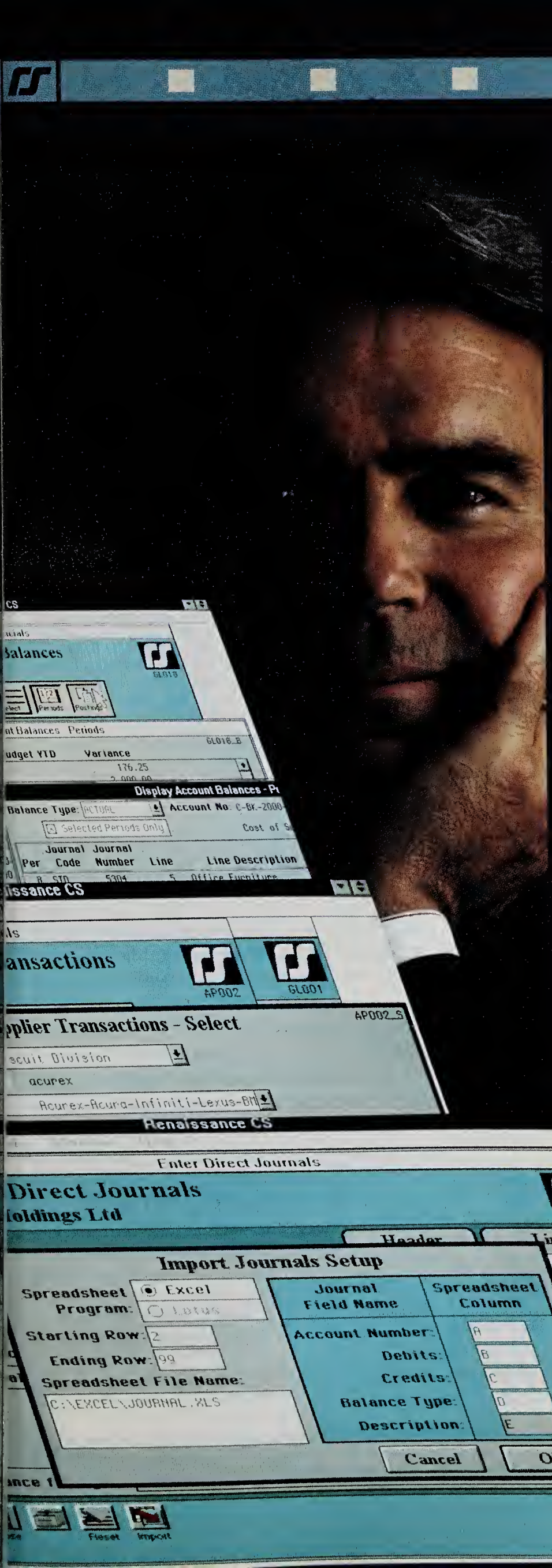
Nine-year-old NextStep remains the most mature object development environment, and its high-level, front-end tools are being integrated with Sun's Distributed Object Environment, giving the tool set an extensive plumbing that it lacked. When finished, NextStep will be CORBA-compliant, and its tools will be useful for cross-platform development.

By mid-1995, the IBM/Apple Computer, Inc. spin-off, Taligent, Inc., is expected to bring forth an object-oriented operating system that will match many of the features of NextStep but provide more specific frameworks for vertical applications. Meanwhile, IBM continues to work on its System Object Model/Distributed System Object Model (SOM/DSOM), which it originally developed to allow objects composed in different languages to message one another under OS/2.

SOM/DSOM are being used by Component Integration Laboratories, a group of vendors that includes Apple, WordPerfect Corp. and Borland, to develop OpenDoc, a compound document standard that is being designed to work with OLE objects.

The major vendors are now competing fiercely to improve the prospects for object interoperability. Progress will occur fitfully, but it will come. It may even stay a step ahead of where an organization just starting out in object-oriented development might be a year from now. But if you already have your feet wet, proceed with caution. Your needs for integrated tools and development environments could easily outstrip the state of the art as it exists today. ◩

Babcock is Computerworld*'s technical editor.*



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ROSS SYSTEMS

THE LEADER IN MIDRANGE CLIENT/SERVER APPLICATIONS

What's Next from

In an industry where the trip from legend to loser can span just a few years, Steve Jobs has had quite a ride. His spectacular success with the Mac led to spectacular failure with the overpriced Next box. Now his mission is to lead the object revolution with NextStep.

CSJ Is Microsoft your most formidable threat?

JOBS We're pretty convinced that their object lightbulb hasn't come on. They call documents objects, but documents are documents. Object Linking and Embedding is not an object model. It's a compound document architecture, and it's not a particularly good one because the developer has to implement everything. It's just mostly a specification.

Microsoft's marketing department will have objects long before their engineering department does.

CSJ How will you protect and secure your lead against other object environments such as Microsoft's Cairo and IBM and Apple Computer's Taligent?

JOBS We have the lead because we embraced pure object technology probably five-plus years before anyone else did. We're in our third release of NextStep, 3.2. As you know, a 1.0 release of something like this is almost worthless.

Our strategy is very simple: to go after the corporate market exclusively. We focus on four markets: financial services, telecommunications, health care and government.

We see that the object race is going to be a three-horse race between Microsoft, NextStep/OpenStep and Taligent.

CSJ What about Taligent?

JOBS Taligent has a few problems. No. 1, they tried to do everything themselves: build their own graphics, build their own operating system. We've done it very differently. We went out and leveraged the work of others. We were able to put most of our talent into what really counted — the objects. That's what the developer will see. Taligent has put most of their energy into objects the developer will never see, down at the bowels of the operating system. Who cares? Nobody.

CSJ How do you want users focused today on client/server development to view Next?

JOBS The customers we talk to aren't going to get rid of their mainframes because they have a bunch of applications on their mainframes that they're never going to get a chance to rehost on client/server. [But] all new apps they want to put on client/server.

CSJ There are an awful lot of tools on the market addressing that problem now, aren't there?

JOBS Client/server has produced a major gain in the price/performance of hardware... [but] the client/server revolution is stalled. You can move from the mainframe to client/server hardware and see a tremendous benefit, but you see almost *no* difference in the amount of time it takes to create the apps.

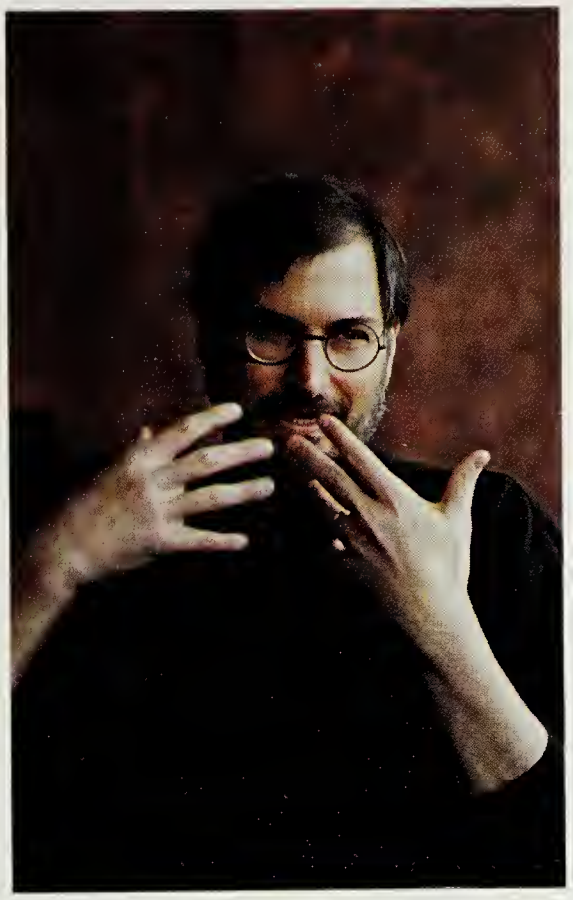
So the next thing [users] do, they grope for these simple tools they think are going to help them, like [Powersoft's] PowerBuilder or [Microsoft's] Visual Basic. Problem is, these tools crash and burn. When you really try to do something serious, you find yourself dropping back into either their limited languages or back into C to write all your code.

CSJ But once these tools are available at the server level as well, won't those issues go away?

JOBS Not true. In the client/server world,

BY MARYFRAN JOHNSON

Steve Jobs?



you really want your applications to be as much on the client as possible. The last thing you want to do is write your application on the server. You're going back to a mainframe model then.

CSJ What about the issue of the "fat client" syndrome or putting too much burden on the client machine?

JOBS The client hardware is getting faster. The bottleneck in client/server is truly getting the apps done on the clients. We use very rich, deep object technology to allow people to build apps five to 10 times faster with NextStep than you can with anything else.

We believe that it's the object revolution married with the hardware client/server revolution that's going to realize the promise of client/server computing in this decade.

CSJ Some observers believe you have a fundamental marketing problem in the emphasis you put on the NextStep operating system. Shouldn't you downplay "the plumbing" and concentrate on the tools and object services instead?

JOBS We think Intel is going to be our most popular and highest-volume platform. We think we're going to do about 100,000 copies this year, between us and our partners. Then 300,000 copies next year and about a half a million copies in 1996.

But the biggest reason is that it enables us to be much nimbler if we can have the same operating system on all the platforms. If we ported this thing onto 300 different versions of the operating system, we'd have a tremendous maintenance nightmare and a compatibility nightmare.

CSJ But you're porting NextStep to Sun's Solaris operating system. What's different about that relationship?

JOBS Sun is betting their company on ▶

> "With every bone in my body, I believe all software construction will be done with objects – sooner or later."

PHOTOGRAPHY BY DAVID POWERS

Continued from page 69

NextStep. They have made a one-company, one-technology, one-architecture decision for objects, and that's going to be OpenStep.

CSJ But Sun is not giving up its own object plans with Distributed Objects Everywhere (DOE), so how is this all going to be integrated? And how is OpenStep different from NextStep?

JOBS DOE is the plumbing, and they've kept their own plumbing, which is fine. OpenStep is a spec, a piece of paper. It's the operating system-independent portion of NextStep 3.2, which is approximately 95% of it. Sun is licensing OpenStep, which they are then suturing onto Solaris.

The OpenStep spec . . . should be out by June 30. We're working with X/Open Co. to have them administer and license it for free.

CSJ What took you so long to get openness as a religion? Do you wish you'd done it two years ago?

JOBS I wish we had formed a relationship with Sun two years ago.

CSJ You mean back when [Sun Chief Executive Officer] Scott McNealy was saying he'd rather stick pins in his eyes than work with Next?

JOBS Yeah, sure! The bottom line is, once we got out of the hardware business, we found out we had a lot more in common than we did separating us. Our engineering cultures are almost identical.

CSJ How does NextStep/OpenStep compare with Portable Distributed Objects (PDO)?

JOBS Those are completely different. NextStep has objects that talk to one another or send messages to one another. In every object system other than ours, objects that sent messages back and forth all had to be in the same address space. You couldn't take an object in one program and send a message to an object in another program.

About 18 months ago, we broke the barrier of that with what we call distributed objects. That meant a NextStep object running on this machine here could send a message to a NextStep object running in another program on that machine or in a program on a completely different Next machine over the network.

Then, when we started to do the work with HP and PA-RISC, they wanted to run some NextStep objects on their servers. So we yanked out the whole object model and the messaging infrastructure of NextStep and made it run in a vanilla Unix process so you could run it on servers. That's PDO.

Today, PDO is only for HP/UX, but we [plan to ship it] for SunOS and Solaris, and we've announced an agreement with [Digital] for OSF/1 and Alpha.

> "Objects take time. This technology is 10 times harder than the Macintosh, and I watched Microsoft take 10 years to try to copy the Mac. We believe we have probably a 5-year-plus lead over them, and we're not standing still."

CSJ NextStep is written in Objective C, while Microsoft and the rest of the world seem to be heading to C++. Did you make the wrong choice?

JOBS No. We have something that only Smalltalk has, which I would call Live Objects vs. Dead Objects. C++ has Dead Objects because everything about the objects talking to one another is frozen at compile time by the programmers. It's like two people shaking hands and you pour lucite over them and they're frozen together.

The goal should be that you make a lot of decisions at runtime. In a Live Object system, I change that object once and it migrates to all those apps and replaces those objects.

CSJ What does your financial picture look like now?

JOBS We ended up doing about $11 million in revenues last year. We beat our plan. And we put a lot of work into our '94 business plan. We believe we can do about $50 million in software revenues and about 100,000 copies.

CSJ What did you learn from the failure of your hardware business?

JOBS We learned we couldn't provide the value proposition to get people to take a risk on an $8,000 proprietary hardware box. But we absolutely have the reward to get them to take a risk on an $800 piece of software. ◩

Johnson is Computerworld*'s news editor. Her Internet address is mjohnson@cw.com.*

Objects' Hidden Business Benefits

Object technology's proposed benefits include easier development, a better business fit, a more natural management of complex information and the simpler deployment of applications by providing a malleable environment. In short, the proverbial silver bullet.

The actual business benefits demonstrated to date are perhaps different. Many early adopters of object technology have failed to realize the benefits claimed. For instance, no major object-oriented database has yet challenged the legacy data management facilities of traditional file systems (such as VSAM, ISAM and dBase), let alone the hegemony of the relational database model.

Despite the shortcomings, there have been demonstrable benefits: ease of GUI specialization and portability, rapid development of different views of information and the extensibility of applications without the need to build all functionality from scratch.

So how do you achieve the business benefits of object-oriented development? An effective development methodology is key and the discovery of objects and classification of their behavior more critical than the minutiae of the definition of a modeling technique. Object-oriented methodology pitfalls lie in the effort to achieve theoretical perfection.

Another issue standing in the way of effective development is the language fallacy. There is an illusion that by using an object-oriented syntax (such as C++), the learning and comprehension curve of object-oriented technology can be bypassed. The essence of object orientation, however, is that it is not just another programming technique but rather a new way of approaching problems.

Object-oriented methodology pitfalls lie in the effort to achieve theoretical perfection.

Business benefits realized by using object orientation at Chase Manhattan Bank include the following:

- The use of Smalltalk on an OS/2 platform for easy integration of disparate products/procedures, including image distribution for customer service.
- The use of Smalltalk on a Sun Unix platform to build a flexible query generator rapidly.
- The use of object-oriented Cobol to capture legacy systems knowledge to convert mainframe CICS programs to client/server.
- The use of OLE 2.0 as a desktop tool integrator for Microsoft's Visual Basic and Powersoft's PowerBuilder in a Windows environment for the rapid development of a complex business application using components.

Advantages have been seen here in responsiveness to change, encapsulation of complex behavior, a message passing model for systems integration and a component approach to developing complex systems.

These benefits have allowed the businesses involved to prototype different solutions more rapidly than other technologies, to extend the application to handle new functionality without the cost and time penalties associated with traditional systems maintenance and to look at different components to solve business problems without having to modify the architecture of their applications.

Despite the progress, maintenance remains a problem. Unfortunately, we see little evidence of the general reuse of code yet. The object class browsers, the distributed repositories and the template development techniques necessary are still in their infancy.

Even when tools and techniques to facilitate reuse mature, a larger problem remains. IS culture rewards new development rather than maintenance and has limited incentives or traditions for software reuse. Reinventing IS culture is a larger issue than can be tackled here now, but it is the only way we can expect to achieve real software reuse. ◩

JONATHAN VAUGHAN

Vaughan is vice president of applications systems technology at The Chase Manhattan Bank NA's corporate technology and information services group. He has spearheaded the introduction of client/server technology at Chase and chairs a bankwide client/server working group. His CompuServe ID is 70403,2557.

EXCLUSIVE SURVEY

DO CLIENT/SERVER

YES: 61%

Cost savings are achievable with client/server applications, according to 61% of 137 users surveyed by *Computerworld Client/Server Journal*. But expect the project to take more than six months to produce results and don't expect huge savings. The majority of users reporting cost savings said it took them six months to a year to receive a return of less than 1% of their IS budgets.

How long did it take to achieve cost savings?

15%	LESS THAN 6 MONTHS
26%	6 MONTHS TO 1 YEAR
7%	1 YEAR TO 2 YEARS
1%	2 YEARS TO 3 YEARS
51%	DON'T KNOW

What percent of your IS budget was saved?

20%	LESS THAN 1%
12%	1% TO 10%
12%	11% TO 30%
6%	31% TO 50%
1%	MORE THAN 50%
49%	DON'T KNOW

What other benefits have you realized?*

55%	BETTER ACCESS TO DATA
31%	FASTER PERFORMANCE
20%	MORE UP-TO-DATE SYSTEMS
12%	LESS DOWNTIME
6%	CUSTOMER SATISFACTION
5%	GUI/INTEGRATION WITH WINDOWS ENVIRONMENT

*MULTIPLE RESPONSES ALLOWED

How have these cost/benefit results affected your company's attitude?

45%	SPEEDING UP CLIENT/SERVER APPLICATION DEVELOPMENT
12%	RAPIDLY REPLACING CURRENT SYSTEMS WITH CLIENT/SERVER

Survey conducted by First Market Research Corp. using random telephone calls from a list of pre-identified sites with one or more client/server applications in place.

PROJECTS PAY OFF?

NO: 39%

What were the major reasons for no payoff?**

- **46%** TOO EARLY TO TELL
- **19%** APPLICATION COST MORE THAN EXPECTED
- **12%** STAFF COST TOO HIGH
- **12%** DON'T KNOW

**TOP 4 CHOICES

What were the biggest cost surprises?†

1. STAFF WITH CLIENT/ SERVER EXPERTISE
2. NEED TO FILL IN GAPS IN VENDOR OFFERINGS
3. SERVER APPLICATION SOFTWARE
4. CLIENT APPLICATION SOFTWARE
5. TRAINING OF TECHNICAL STAFF
6. SERVER DATABASE SOFTWARE
7. SERVER HARDWARE
8. CLIENT HARDWARE

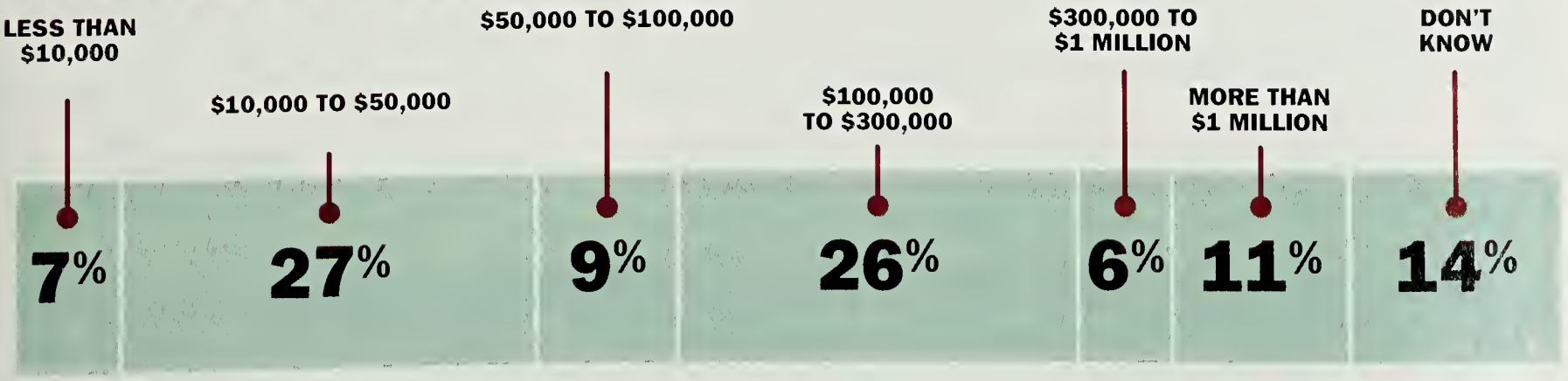
†LISTED BY MOST FREQUENT MENTION

How have these cost/benefit results affected your company's attitude?

- **30%** MOVING SLOWLY IN CLIENT/SERVER
- **4%** STOPPING IMPLEMENTATION OF CLIENT/SERVER

COSTS:

Project size for most applications fell into two groups: $10,000 to $50,000 and $100,000 to $300,000. Only a handful of respondents reported projects valued at more than $1 million.



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The move to client/server can be perilous, as some may have already discovered. Optimizing performance in the mainframe world is tricky enough, but the client/server environment compounds the problems by increasing the number of variables.

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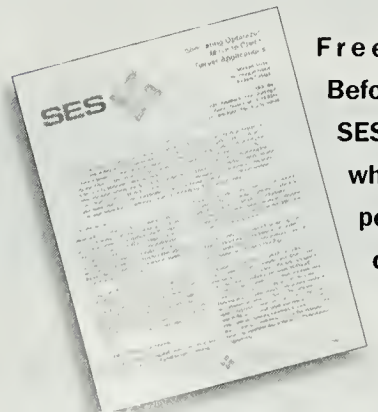

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RESHAPING THE MOLD

Determining outsourcing prices no longer means counting mainframe cycles but sharing risks — and rewards

Outsourcing economics are changing radically with the move to client/server computing, throwing open pricing opportunities based on actual business results derived by the customer.

But though "gain sharing" is getting fair rumination, the outsourcing world is struggling to derive price formulas that equitably measure the impact an outsourcer has on a customer's profits and revenue.

Many analysts say pricing, not technology, is the bane of client/server life for traditional mainframe outsourcers. It is therefore causing consternation among customers, who are puzzled about how much they should pay for services.

Long accustomed to price schemes based on processing cycles and direct-access storage devices, outsourcers and their customers are finding client/server computing far more difficult to measure with its high service content, rapid rate of change and granular architecture.

Gain sharing, in which a customer's payments are based on a business advancement such as savings or increased margins or sales, is one possible solution to vendors' and customers' pricing quandary.

Electronic Data Systems Corp., for example, counts hotel movie supplier Spectravision in Richardson, Texas, health care products vendor Baxter International, Inc. in Deerfield, Ill., and the city of Chicago ▶

BY MARK HALPER

ILLUSTRATIONS BY DAVID CLARK

Continued from page 75

among its gain sharing customers. EDS equates gain sharing with increases in Spectravision's revenue, with heightened market penetration by Baxter and with each parking violation collected by Chicago using EDS technology.

In one of the best known and most extreme examples, Perot Systems Corp. bases part of its compensation from its showcase customer, Europcar International, on a share of Europcar's profits. Europcar did not return calls by press time.

Del Monte Corp., which uses EDS as a mainframe outsourcer and technology partner, recently migrated its plant floor applications to IBM AS/400 platforms and is now getting ready with EDS to migrate its mainframe operation to Unix. Chief Information Officer Dave Macpherson is not yet sure how he will work out pricing of the Unix switch, noting "That's a bridge we have yet to cross."

While he acknowledged that gain sharing is a possibility, Macpherson said he will not ignore the nuts and bolts components of hardware, software and labor.

Whatever the charges, they will be incremental to charges agreed to in a 10-year, $150 million mainframe and telecommunications outsourcing accord EDS and Del Monte signed in November 1992, he said.

THE OLD ARGUMENT

With mainframes, outsourcing vendors charge their clients on how many CPU cycles or how much DASD capacity is used, profits grow as service exceeds "base line" levels and one box is often leveraged across various customers.

PRICE NOT MAIN CONSIDERATION

Just like Macpherson is not sure he will go with a gain sharing approach, not all customers are aiming to break new pricing ground. Eckerd Corp., a Clearwater, Fla.-based drug store chain, for instance, gave gain sharing only fleeting thought when it was negotiating a 10-year, roughly $380 million deal with IBM's Integrated Systems Solutions Corp. (ISSC) last year.

"A little of that came up, but it's quite difficult to determine how you're going to do it," said Jerry Rothmeyer, Eckerd's vice president of information technology.

As Rothmeyer noted, it can be virtually impossible to ascertain how much of a business gain is attributable to a computer system vs. how much comes from a myriad of other business factors.

"It's easiest when there's a direct link between each transaction and a dollar gain, such as in EDS' contract to process parking violation payments for the city of Chicago," Rothmeyer said.

But for overall pricing purposes, that link did not exist at Eckerd. So, according to Rothmeyer, Eckerd settled on a simpler approach. With assistance from Gartner Group, Inc. consultants, it appraised what its costs would be during a decade of client/server computing and then asked for bids from ISSC and EDS.

ISSC presented a proposal that was "substantially lower" than both Eckerd's internal plan and EDS' bid, so Eckerd went with it last July, Rothmeyer said. "How [ISSC] priced theirs, I have no idea," Rothmeyer claimed. But the simple economics are that ISSC has committed to a price Eckerd deems to represent significant savings over 10 years.

DEALING WITH REALITY

For the most part, sharing in gains from a customer's business has remained more a concept than a pricing reality in client/server deals. But another form of gain sharing has taken hold: Outsourcers and their customers are increasingly forming partnerships to market technology developed originally for the customer.

"Companies who are looking for ways to provide better services to customers are finding that the same problem they have with existing customers will cause problems for other customers in other industries, so why not sell that expertise?" asked Jim Barbour, president of Analytical Technologies, Inc., a Bingham Farms, Mich.-based client/server outsourcer and systems integrator.

For instance, the Phibro Division of Salomon, Inc., a Westport, Conn.-based commodities trading firm, is signing up customers for an integrated commodities trading system that it designed and that SHL Systemhouse, Inc. installed and maintains.

The two companies, in fact, together market the system in which various commodities services including the Dow Jones News Service, Reuters and Telerate are funneled into common servers

and disseminated to desktops, alleviating the need for separate terminals for the various commodities services.

For its own internal purposes, Phibro uses Sun Microsystems, Inc. servers, which feed Intel Corp. I486- and Pentium-based PCs running Next Computer, Inc.'s NextStep operating system. The system also draws on a Sybase, Inc. database.

Phibro sells licenses for the software, and SHL acts as the systems integrator and also receives royalties on the licenses, said Vincent Annunziata, Phibro director of sales and new technology.

According to Annunziata, the company has sold licenses to three oil trading firms: EOTT Energy Trading Co. in Houston; PMI Commerciala Internacional, a trading unit of Mexico's national oil company, PEMEX; and Houston-based PEUSA Energy Trading. "The money we're getting from selling the system is paying for the system," he noted.

Canada Post may also be heading toward a marketing partnership with SHL Systemhouse. The two companies signed a 10-year, $800 million (U.S.) client/server pact last fall calling for SHL Systemhouse to migrate many of the postal service's IBM 3090 operations to distributed platforms using about 9,000 PCs.

In time, the duo may together market their information utility technology to other postal services, said Ron Keating, Canada Post's director of information technology strategy. "Check with us in another year," he said. The postal operation already markets software developed by various systems integrators including SHL Systemhouse, Keating said.

But before the two organizations implement any fancy gain sharing models, they will first wrestle with some nitty-gritty pricing issues, trying to determine how precisely to break down charges among the myriad operations performed by SHL Systemhouse.

"How do you charge software that's licensed on a server basis but that's used by each workstation?" Keating asked. "How do you figure where the network leaves off and the network server begins?"

THE NEW REALITY

In client/server environments, the outsourcer's compensation is partly based on profits realized by the system or resultant technology sold to others. The old model doesn't work because CPU cycles and storage are scattered and harder to measure.

As ISSC Treasurer Todd Gordon noted, the complexity of client/server pricing is enormous. "Customers are requiring multiple line items to show what workstations are involved, what software is running at what level, how much of that is out there, how much they are paying per month, how it is being allocated to the user community and how much is the maintenance," he said. "They're asking for a very granular, almost expense item reporting."

ISSC is taming this beast using its NetView network management software, according to Gordon.

The operational complexities can create an internal headache for outsourcing customers, who often pay the outsourcer through a central department. That department must devise ways to track usage by end-user departments to charge those departments their fair share of the outsourcing fees.

That issue is bedeviling Canada Post and has also concerned New Orleans-based ISSC customer Freeport-McMoRan, Inc., according to the energy and mining company's chief information officer, Mike Arnold.

The fact that Keating and Arnold do not have a lot of examples to go on sums up the client/server outsourcing pricing situation in general.

"This will be physically tough for vendors and users to get their hands around. There are a lot of unknown factors," observed Frank Casale, executive director of the Outsourcing Institute in New York.

"Everyone is on a learning curve," agreed Dataquest, Inc. analyst Julie Schwartz.

"Outsourcers know how to run client/server environments," added William Rabin, an analyst at J. P. Morgan Securities, Inc. in New York. "But what they don't know how to do yet is write a proposal that gives the customer what they're looking for but also is priced to give reasonable margins back to the outsourcer." ◩

Halper is a Computerworld *West Coast senior correspondent.*

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The Changing Face of Software Licensing

Flexibility, flexibility, flexibility.... That's the mantra heard 'round client/server negotiating tables these days as IS departments and vendors wrangle over fair terms and conditions for licensing all types of software, from development tools and utilities to operating systems and databases.

Take American Cyanamid Co.'s Agricultural Group. The $2 billion unit is expanding its Oracle-oriented client/server network with financial and administrative applications developed by SAP America, Inc. Ironically, William Zeitz, director of information services, is adding by subtracting: Rather than paying for three Oracle Corp. databases, he recently negotiated a concurrent, floating licensing arrangement that lets 400 users access Oracle data residing on 10 machines connected via a wide-area network.

Though flexibility, not cost savings, was his primary motivation, Zeitz figures he will save his company half a million dollars over the next couple of years. "It's a win/win," he said of the renegotiated pact. "It allows [Oracle] to cover its research costs and allows us to apply our current architecture to as many nodes across our wide-area network [within the terms of the agreement], regardless of where the users reside."

AMERICAN CYANAMID'S WILLIAM ZEITZ figures he's in a win/win situation with a floating license

Though declining to comment on the specifics of the American Cyanamid agreement, Oracle said it deviates from list prices, which are based on the number of users running its database on a specific platform, when appropriate.

"We work closely on usage and deployment with customers who are rightsizing and try to come up with reasonable prices for the solution or product," said Lori Mirek, Oracle's director of systems product marketing. "Large customers make an investment in us, and we try to make an investment in them."

American Cyanamid's situation is indicative of what many client/server pioneers are going through: They don't want software licensing tied to processor size. Information systems managers, particularly legacy systems converts, find so-called "tiered pricing" inflexible in client/server setups. Particularly onerous, they said, are the pricey upgrade fees levied by some vendors if a program is moved to a speedier processor, a not uncommon occurrence in client/server.

Vendors, on the other hand, want to receive an equitable ▶

BY ALAN ALPER

PHOTOGRAPHY BY CLAUDIO EDINGER

SOFTWARE DIVIDE

Licensing in the client/server world has its share of headaches for both users and vendors

User problems	Vendor problems
■ Constraints on software architecture	■ Loss of revenue in distributed topology
■ Added distributed CPU fees	■ Increased costs not covered by downsized fees
■ No credits for old licenses	■ Inability to track perceived value

Source: Open Users Recommended Solutions Group

Continued from page 81

price that not only covers research and development costs but also helps underwrite future development. "They're trying to balance their need for revenue generation and protecting the integrity of their products, while the customer wants to manage their software assets and pay a price that corresponds with the way the software is used," said Mike Schelp, president of Ventana Consulting in Cupertino, Calif.

One problem is that many vendors don't spend enough time trying to understand the subtlety of software licensing, he noted. "For the most part, vendors don't have people devoted full-time to understanding business practices."

User groups are chiming in to nudge vendors in the right direction.

Members of the Society for Information Management (SIM) recently recommended to the organization's licensing task force that users embarking on client/server projects either license software to use across the enterprise or obtain concurrent usage licenses, which allow a specific number of users to access the software within certain parameters.

"We can't view the vendor as an adversary," said Harvey Schrednick, senior vice president of IS at Corning, Inc. in Corning, N.Y., and vice president of communications at SIM. "It doesn't make sense to say the vendor tried to screw me so I'll get one over on him now by trying to get lower prices for my organization."

The Open User Recommended Solutions (OURS) group, meanwhile, has crafted software licensing guidelines to help IS managers decipher which licensing approaches are most appropriate. The group also unfurled a white paper defining terms.

> Vendors may never be able to offer a one-size-fits-all licensing approach.

"We needed a lexicon to eliminate issues that arise due to semantics," noted Eugene J. Rudnicki, manager of corporate contracts for software and technology acquisitions at Motorola, Inc. and co-chairman of the OURS software licensing task force.

One particularly befuddling area is "follow-on" versions of software, as many vendors use different terms: modification, update and release. "There's been a departure in terms of agreement, which creates confusion and occasional mistrust, particularly where there's an expectation by users to a certain entitlement of support," Rudnicki said. "Users would like to see uniformity."

Although users would like uniformity, vendors may never be able to offer a one-size-fits-all licensing approach. What may work for databases may not fit for tools and utilities.

GO CHANGE

Too many resellers and users were complaining to Legato Corp. that the Unix network storage management vendor offered too many versions of its product. So last fall, the Palo Alto, Calif., developer revised its licensing scheme.

Under the old approach, Legato licensed its software by "bands" of authorized users in combination with the size of the automated tape subsystem that the program controls. The number of versions made it difficult for resellers to stock as well as unwieldy for users to install and upgrade.

With the September debut of Networker 4.0, Legato added a license management module to automate the process. Resellers need to stock only one version of the product; users can purchase one version and configure it themselves — as long as they register with Legato and obtain the appropriate enabling software keys.

"It's worked out well," said Ed Cooper, marketing vice president. "There were concerns that this was new to customers and 'the channel,' but we haven't had any problems."

This is how it works. Customers order evaluation units and test Networker 4.0 for 30 days. If they want to license it, they tell Legato or a reseller how many users to authorize on what type of subsystem. After paying, the user receives the enabling keys to put the software into production.

Legato users upgrading their software also benefit. Previously, they needed to boot numerous disks or mount a tape to reconfigure the software, Cooper said. "Now it takes less than five minutes to install the enablers, and you're off and running."

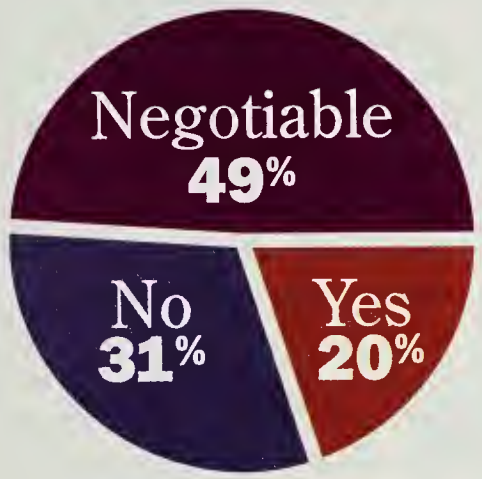
Legato's customers seem to like the changes. "Tier pricing approaches usually caused companies to buy too much or too little," said Jon Almada, backup and archive administrator at a large defense contractor in Northern California. "Now I can add specific hardware in different combinations. It's made it a lot easier for me."

CAN WE TALK?

Many client/server software developers are willing to offer enterprise licenses — if users ask

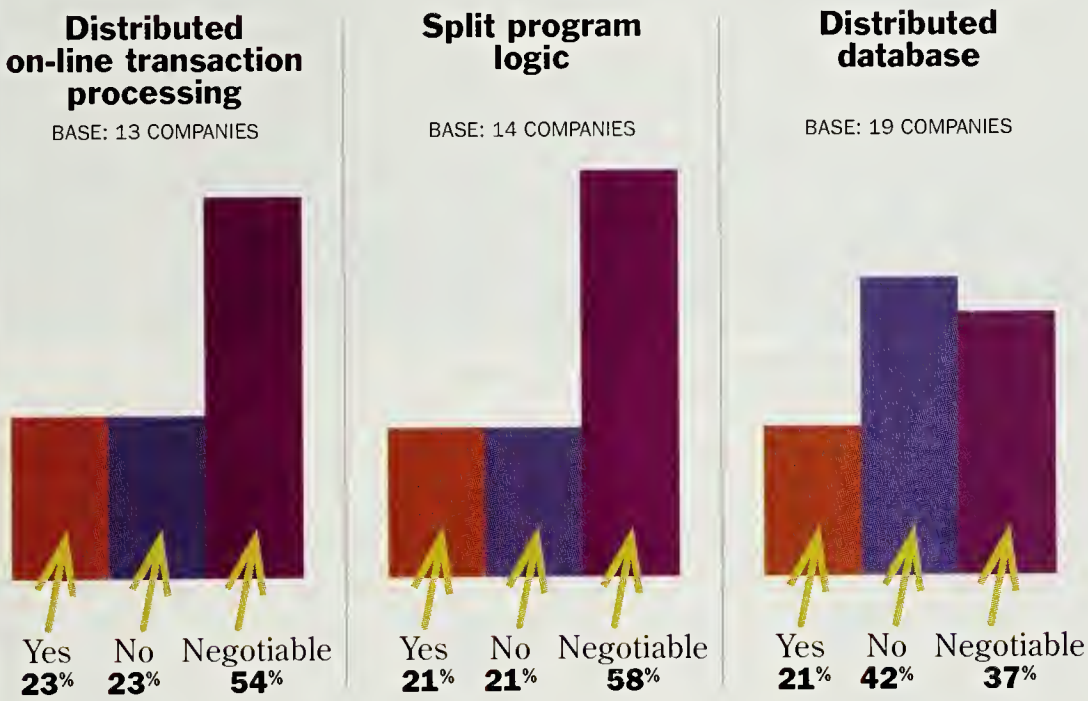
Do you offer an enterprise license?

BASE: 51 CLIENT/SERVER SOFTWARE COMPANIES



SOURCE: CULPEPPER & ASSOCIATES, ATLANTA

Enterprise license by client/server model



Concurrent and/or floating licensing is gaining popularity in the client/server applications and database worlds. Users are embracing the schemes because network topologies are constantly changing, said Tony Picardi, an analyst at International Data Corp. in Framingham, Mass. "They want to pay for the software's intrinsic value, not where it runs," he explained.

FINDING THE RIGHT SCHEME

Picking up the concurrent licensing trend, Pure Software, Inc., a Sunnyvale, Calif., purveyor of C and C++ tools, adopted a floating usage model in 1992. But the approach was problematic, particularly when more developers wanted to access the software than were permitted to under terms of their agreement with Pure Software, a spokeswoman explained.

Last summer the vendor crafted a licensing scheme built around trust and simplicity. Its new plan is to allow unlimited use of its tool, as long as support is paid up by each user. Roughly 90% of Pure Software's customers converted to the new approach, the spokeswoman said.

Other vendors are concerned that they might get shortchanged by concurrent user pricing. For instance, what happens when a global company negotiates a concurrent usage license with a vendor that priced the software based on an eight-hour work day? "Many vendors' business models don't account for 24-hour usage," Schelp said.

Pure Software has crafted a licensing scheme built around trust and simplicity.

Licensing issues are also critical where legacy software intersects client/server computing. Many mainframe licenses are site-bound and node-locked. The advent of client/server architectures has changed all that, Motorola's Rudnicki observed.

For example, global companies may want to send software to remote locations over their WANs. Many of the old licenses were either site- or U.S. usage-specific, Rudnicki said. "Users need to visit all licenses to ensure they continue to be in compliance, and if changes are necessary, we negotiate," he explained.

Recognizing that users want licensing schemes that reflect how they use software, client/server vendors have tweaked their formulas. Informix Software, Inc. in Menlo Park, Calif., for example, adopted an approach that disregards the hardware platform. "Machine tiers forced users to make uneconomic purchase decisions," noted Steve Sommer, vice president of sales and marketing.

Leading client/server application developer PeopleSoft, Inc. in Walnut Creek, Calif., agrees. The vendor recently adopted a platform-independent licensing scheme. It will now base licensing exclusively on numbers of users plus customer ▶

CORNING'S HARVEY SCHREDNICK: 'We can't view the vendor as an adversary'

Continued from page 83

size (number of employees for its human resource software; revenue for its financial software). "We want to give customers the freedom of choice," said Ray Gadbois, director of corporate marketing.

Even Microsoft has revised its licensing scheme in the last two years to accommodate customer needs and provide volume purchase incentives across its product line. Begun in January 1993, Microsoft Select allows users to obtain enterprise or variable usage licenses as long as they provide forecasts to and work through authorized resellers.

So far, Microsoft said it believes the program is an unrivaled success. "We initially forecast 200, 250 Select customers through the first year. We had 900 agreements in 13 months" as of February, noted Craig Fiebig, Microsoft's director with responsibility for worldwide software licensing.

Meanwhile, Microsoft and other vendors are exploring license managers that would allow customers to more thoroughly administer software usage and better manage their software assets.

For example, Hewlett-Packard Co. and Novell, Inc. have licensed license management software from Gradient Technologies, Inc. in Marlboro, Mass., that they will offer with their products. And Globetrotter Software, Inc. offers licensing management software that is embedded in some 500 Unix software products.

IS managers find so-called tiered pricing extremely inflexible.

Moreover, some user and vendor companies are exploring software metering as a way to extend software asset management to a new measurement plane. So far, the jury remains out (see story at right).

Meanwhile, the multiplicity of licensing options is sure to keep users and vendors up late at the bargaining table for some time to come. To break the negotiation logjam, software vendors should consider stealing a licensing page from long-distance telephone companies, which offer a plethora of ways to sell the same thing: telecommunications service.

"Software vendors, similarly, need to recognize that customers use products differently and need to price them accordingly," consultant Schelp concluded. ◩

Alper is the editor of Computerworld Client/Server Journal.

PAYING BY THE DRINK

Looking to take license management one step further, some vendors and users are investigating technology that would measure actual client/server software usage.

Some users say metering could put software licensing on the "value pricing" plane where it belongs. "I'd love to pay by the drink," noted David Cameron, chief information officer at Atlantis Group, Inc., a $250 million plastics manufacturing holding company in Coral Springs, Fla.

Not everyone agrees. The systems overhead required to run metering software would undercut network performance, noted William Zeitz, director of information services at American Cyanamid and co-chairman of SIM's software licensing task force. "I'm personally not in favor of measuring usage; it's not realistic," he said. "The value in software is in using it. Whether I use 3 MIPS or 12 MIPS is not the issue. The value to me is in the number of concurrent users."

Allan Deering, vice president of information management services at Pepsico, Inc. in Peekskill, N.Y., said metering's ability to let IS accurately charge user groups for their software usage is not worth the effort.

Surprisingly, the possibility that vendors could become "Big Brother" isn't an issue for most users. "The value is so large that I don't think users get hung up on it," Cameron said.

Meanwhile, some database developers are moving ahead. Cincom Systems, Inc. will eventually use an automated meter for customers that want to license its Supra database under a tier plus usage-based plan. Right now, Cincom is trusting its customers to tell it what they are using.

Sybase, Inc. feels metering might be appropriate for large telecommunications and banking customers, according to Paul Albright, director of business development. "We're talking with some customers to see how we can approach it."

PHOTOGRAPHY BY BOB PROCHNOW/SABA

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MESS

FATWARE PUTS INCREASED BURDENS ON NETWORK DISK AND TAPE

It's 10 a.m. Do you know where your data is? Does anyone?

Welcome to the wacky world of distributed computing, where reams of data are generated every moment. But that data, critical as it may be, is scattered all over the enterprise with few, if any, controls over it.

Many corporations are just now starting to deal with backing up server data in a coherent manner, and a handful are figuring out ways to migrate seldom-used server information to other, less expensive storage media such as tape.

But few companies are really addressing the true nightmare scenario: What happens if the building catches on fire or is flooded and all the information stored outside the glass house is lost? How is it recovered?

Consider: Some 80% of all PCs in the U.S. are expected to be attached to LANs by the end of next year, according to Peripheral Strategies, Inc., a market research firm in Santa Barbara, Calif., vs. only 40% in 1991. A typical LAN with 5G bytes of disk space has between 200,000 and

BY JOHANNA AMBROSIO

400,000 files on it. And server disk capacity is doubling each year.

The situation is getting a little better. Many companies have started to at least back up the departmental servers to tape devices. These tapes are then stored in the data center or sometimes off-site in a vault alongside the mainframe tapes.

At Nordstrom, Inc. in Seattle, the information systems department just took over responsibility for server backup about two months ago. "We're still developing a plan," said Brad Watson, storage manager. At the moment, his group is backing up three LAN servers by doing full backup one night each week and then differential backups the rest of the time.

THE POLITICS OF TECHNOLOGY

The issues are both technical and political. Products that allow the management of far-flung data throughout an enterprise, from a central location or on a department-by-department basis, are just starting to emerge. Then there are other matters such as network bandwidth and how that suffers when individual departments all over the globe send their server data back to the mother ship.

On the political front, IS staffers who have been asked to "do their thing" with end-user data often find themselves stepping on a land mine of different backup and restore needs. One department may want IS to take over completely, while another wants to set parameters about which data IS may touch.

Then, too, IS people who attempt to bring some order to the chaos may have to play tug-of-war with the individual network administrators who have traditionally done that job. "The political view is that the job of managing data belongs on a higher level than the network administrator," said Michael Peterson, president of Peripheral Strategies. "But network administrators are resisting because they don't trust IS."

Watson noted that one of his problems has been "coordinating with different network administrators" in different places "to get the security authorizations needed to do backups."

STORAGE COSTS

One factor users commonly overlook in moving to distributed environments is the high cost of managing storage.

According to Peripheral Strategies, Fortune 500 firms spend an average of $72,000 on hard disk expansion alone. However, this figure does not include the human factor of managing the data, which adds another $300,000 to the bill, said Michael Peterson, president of the market research firm.

"Users approach storage with the naive view that they can get 1M byte of capacity for $1, when they should add another $8 per megabyte for fixed costs," Peterson said. As users notice these costs, they look for software that provides heterogeneous support across multiple platforms and automates the management process as much as possible.

Peripheral Strategies refers to this software as enterprise data management software, which was used in the mainframe world to port data from other environments into mainframe DASD for management. Several firms either provide or are developing software that ports PC LAN data to Unix backup servers instead of the mainframe.

As a result, Peripheral Strategies projects that enterprise data management will become the fastest growing segment of the backup market. The enterprise market stood at a mere $32.8 million last year but is expected to hit $291 million by the end of next year.

HSM TO THE RESCUE

In fact, the client/server storage management quagmire is making the tried-and-true storage management precepts of the glass house look better and better. Some companies are now trying to adopt some of those for distributed computing. Hierarchical storage management (HSM), for example, is well-known in the IBM mainframe world but is just now making a name for itself in client/server environments.

HSM systems automatically migrate less frequently used data off disks and onto less expensive storage mechanisms such as tape or optical drives. This frees up the server's hard disk drive for data that is used often or by a large number of people. End users, however, can still access the older data.

Bob Abraham, vice president of Freeman Associates, Inc. in Santa Barbara, Calif., agreed. "HSM is an ideal solution for disk overload, which is a constant problem in PC LANs," he said. "Users have an insatiable appetite for storage; you have to feed the monster all the time."

However, widespread implementation of HSM is at best three years or more away, observers said. One of the major roadblocks is overcoming IS' reluctance to add even more complexity to distributed computing.

It took Boulder County, Colo., more than a year to overcome this fear. The county recently went on-line

Please turn to page 90

AND STEPHEN P. KLETT JR.

ILLUSTRATIONS BY ELLEN WEINSTEIN

Imagine their information systems.

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Mike Quintero

Don Black

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Union Pacific Railroad developed a track inventory system to capture information about their track assets, such as where the track is located, what railroad owns it and who's responsible for maintaining it. They were looking for a solution that was compatible with existing systems and wanted support through their entire development process.

The IEF for Client/Server provided more GUI functionality for the Windows application, efficiencies through integration, modified and enhanced code and as a result, easily enabled their existing applications to be moved to target environments.

A powerful arrangement.

But rather than just blow our own horn about the IEF for Client/Server, we asked Mike Quintero, Manager of the Development Center, Data Administration and Design at Blue Cross and Blue Shield of Florida, and Don Black, Business Systems Consultant of Union Pacific to join in.

Mike: "We had all the hooks up in one week and it only took one more week to build the application and generate code. It was a snap."

Don: "I believe our success with this project is a tribute to the capability of the IEF and Texas Instruments in helping us quickly develop powerful building blocks and redeploy them as required to meet our evolving needs. TI supports everything you need for a major project and walks you through each step in a logical, integrated manner."

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TEXAS INSTRUMENTS

Continued from page 87
with an HSM system co-developed by Avail Systems, Inc. and Conner Peripherals, Inc. after beta-testing the system in-house for almost a year and a half.

According to Sue Stanley, manager of technical services at Boulder County Information Services, the county had been looking for an automated system to give its support staff the ability to manage storage and extend disk life, while providing users with automatic access to files. "However, it all had to be under a secure umbrella," Stanley said. "We can't afford to lose anyone's data."

She said plans are to have the entire county attached within two years and to have 10 file servers scattered throughout the county backed up by year's end. "I expect it to solve the problem of users wanting more and more data on-line, and it is an easy and cost-effective way to add it."

AIDING GROWTH

Burlington Coat Factory Warehouse Corp. in Lebanon, N.H., is considering implementing an HSM system to keep up with the data explosion spurred by a 20% annual growth rate, according to Percy Young, director of store systems.

The company recently dumped an Amdahl Corp. mainframe in favor of a client/server network based on six superservers from Sequent Computer Systems, Inc. that manage more than 60G bytes of data.

Young said the company plans to use an HSM system to store historical customer data that arrives on a daily basis from the retailer's more than 200 outlets located throughout the U.S. "We're actually about a year late in implementing HSM," Young said, "but we expect to have a system in place within six months."

HSM is gathering steam in heterogeneous PC LAN environments. Epoch Systems, Inc., QStar Technologies and CommVault have products in the Unix enviroment, while Palindrome Corp., Cheyenne Software, Inc., Conner Peripherals, Inc. and Legato Systems, Inc., among others, have released HSM systems for Novell, Inc.'s NetWare during the last year.

There are some questions, however, about HSM's applicability in large, database-intensive environments, where HSM can create pesky bottlenecks on the network when multiple users need to access files simultaneously. As files are recalled from tape or optical media to hard disk, users often have to wait several minutes before they can access them.

CHOICES, CHOICES

Alternative technologies based on HSM principles are being developed. For example, Alphatronix, Inc. in Research Triangle Park, N.C., espouses a technology called Direct Access that enables users to recall files directly from optical media located anywhere on an enterprise network, resulting in faster access time and freeing up valuable hard disk space (see story page 91).

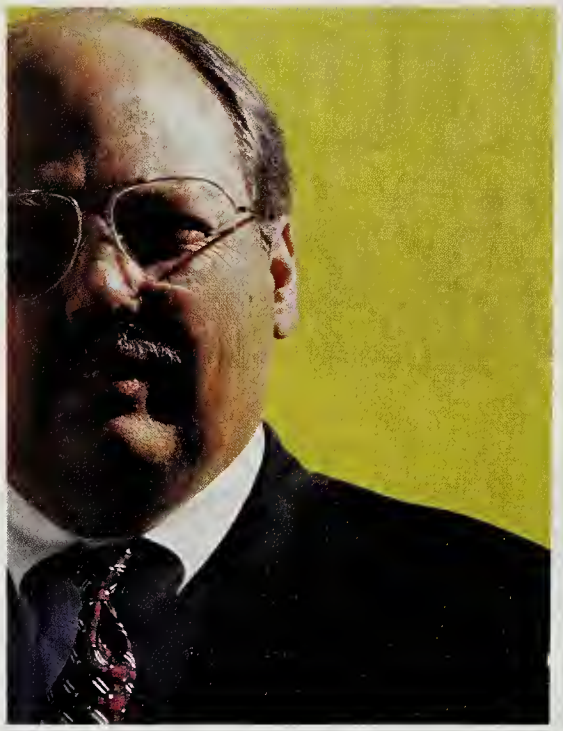
In addition, some of the mainframe systems software vendors have, or will shortly have, storage management offerings that run on LANs. Among them are Legent Corp., Memorex Telex Corp. and Computer Associates International, Inc.

A start-up vendor, Enterprise Technologies in Bridgeville, Pa., has introduced a product it says can help manage data either from a centralized location or on a department-by-department basis. Called Stage3, it works with many of the popular LAN backup software packages, according to the company.

However, users have their doubts as to whether vendors can achieve a truly open backup environment that ensures that products from different vendors will work together.

"Vendors have been talking about these capabilities for years and have yet to deliver," said Michael Kaunitz, network administrator at St. Paul Reinsurance Management Corp. in New York. "I'm not holding my breath."

Indeed, while vendors focus on making their platforms interact, it



ALLEN COURNYER devised his own storage plan

STORING IMAGES

Texas Commerce Bank in Houston entered the world of client/server roughly four years ago with an imaging system and almost immediately ran into storage management problems.

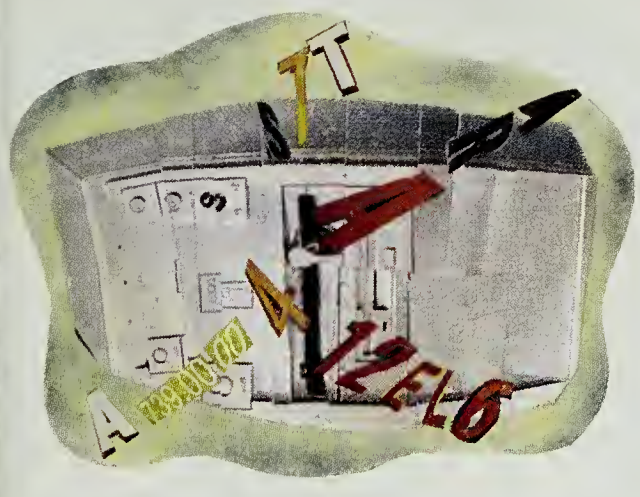
The imaging system is connected to 500 DOS-based workstations and three mirrored servers, each housing 10G bytes of data. Every night, the server data is backed up to tape from a series of disk arrays — a process that takes about 10 hours. While this window is barely acceptable from a backup standpoint, even worse is what would happen if the system crashed altogether, according to Allen Cournyer, vice president of technology operations.

"We would lose an entire day of processing, which would simply not be acceptable in the mainframe world," Cournyer said.

The bank decided it was better to be safe than sorry and set a one-hour limit on how long data restoration could take. Because there was no single product on the market to provide this capability off the shelf, the bank found its own solution. A copy of the bank's database is now transfered to a separate disk array, which is updated every minute throughout the day.

If the system goes down, this data can bring the entire system back on-line in less than 15 minutes, according to Cournyer.

PHOTOGRAPHY BY MARK GREEN



seems users would settle for a system from one vendor that would provide reliable backup in distributed client/server environments. Hence, users are caught in a catch-22 of sorts. Those LAN backup packages that are reliable are often not robust enough, and those that are the most robust are plagued with bugs.

For example, several users recently reported major problems with the latest versions of one of the most popular NetWare-based backup platforms, Cheyenne's ArcServe 5.01. The release had compatibility problems with SCSI drives from different vendors and updates to Novell NetWare Loadable Modules that caused servers hosting the software at several sites to crash, bringing down the entire network.

For example, Cheyenne site Source Electronics in Salem, Mass., has had so much trouble with the software that John Tsoukalas, the company's IS manager, said he has brought in packages from Conner and Legato for evaluation as possible replacements "in order to save my job."

He said the software was crashing the company's server 20 to 30 times a week and that for a period of two weeks, the company had no backup system in place at all, "which made it very hard to sleep at night. ArcServe is a beautiful piece of software — it appears to be the most robust of all — but if it crashes your server, what good is it?" Tsoukalas asked. "Does anyone make a reliable backup product?"

When this article went to press, Cheyenne was shipping an update to both ArcServe 5.0 and 5.01 that it said would resolve these compatibility problems.

Nevertheless, observers agreed that the backup market for managing mission-critical data in distributed enviroments is in its infancy, and until it becomes more mature, users will have to use their ingenuity to solve the problem.

"The message I'm getting from backup vendors today is to keep data centralized. No one owns the whole process to allow data to be distributed over the enterprise," said Allen Cournyer, senior vice president of technology operations at Texas Commerce Bank in Houston. "The market is not close to reaching any level of maturity." He added that "the only way to back up data in mission-critical client/server environments today is to do it yourself; you cannot rely on a vendor to do it for you." ◩

Ambrosio is Computerworld*'s assistant sections editor and Klett is a* Computerworld *staff writer.*

DATA IN THE JUKEBOX

Efficient, reliable backup of data plays a key role in controlling and tracking the movements of locomotives spanning more than 8,000 miles of rail at Southern Pacific Transportion Co. in San Francisco.

However, fast access to the railroad's gigabytes of stored data is just as crucial in "making sure crossing gates drop and trains don't run over pedestrians and such," said Jeff Coughlin, systems administrator at the railroad's signaling department.

Last August, Southern Pacific abandoned its traditional method of backing up data to magnetic tape, which can take several hours to restore, and installed an optical jukebox from Alphatronix. The result is that the signaling department's 23 engineers now have instant access to stored data.

Alphatronix jukeboxes use a proprietary access method called Direct Access that enables users to pull data off the jukebox and read and manipulate it on their workstations. This cuts out the time-intensive steps of recalling a file from tape to optical and then to hard disk, which several HSM systems require, for example.

"Having to continually go back and pull data back from tape is an administrative headache of evil proportions," Coughlin said. "The jukebox eliminates this headache."

Coughlin acknowledged it was a while before he felt comfortable relying on an unfamiliar technology such as an optical jukebox to store mission-critical data. However, he said, the benefits have definitely outweighed the risks.

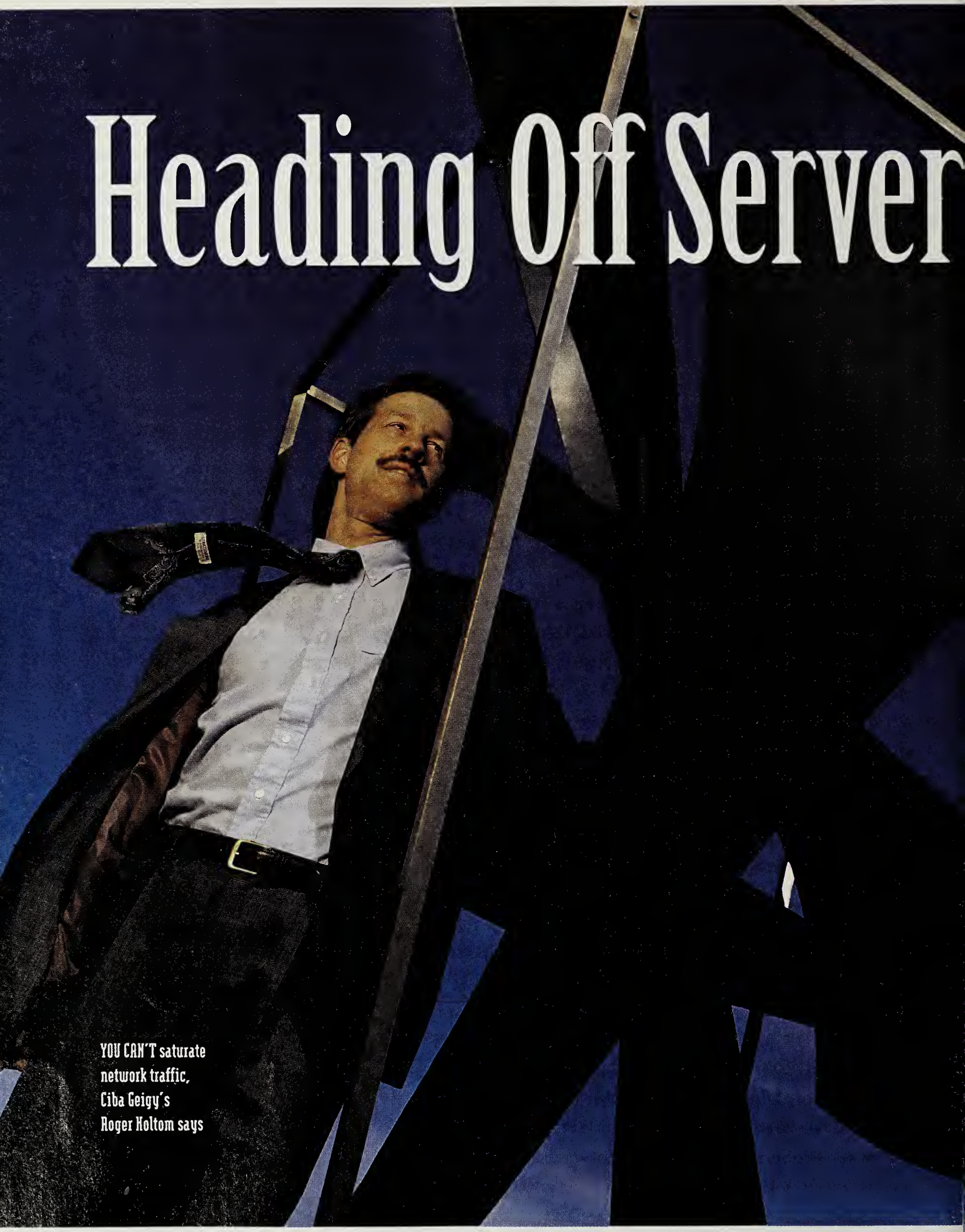
For example, both DOS and Unix data backup information can be stored on the jukebox, "which is important because we are running an open systems enviroment with a mix of platforms," Coughlin said. In addition, the railroad's IBM 3270 mainframe users can access data volumes on the jukebox by uploading them on their dumb terminals, he said. "I'm actually more secure with storing data on the jukebox now than I am on the mainframe — they're forever crashing disks and losing info," Coughlin said.

Another more obvious benefit is optical's ability to store large amounts of data. Southern Pacific has 8G bytes of data on the jukebox, which can house up to 100G bytes. "I don't see how we'll run out of places to put stuff for the next five to 10 years," Coughlin said. "It would take a wall of hard drives 30 to 40 feet deep to accomplish the same task — at a much higher price."

For redundancy, the jukebox is backed up to a separate optical drive, but Coughlin said he has yet to experience "one kilobyte of data loss. But then again, we are located in earthquake central, so we need to have our ass covered — and we do."

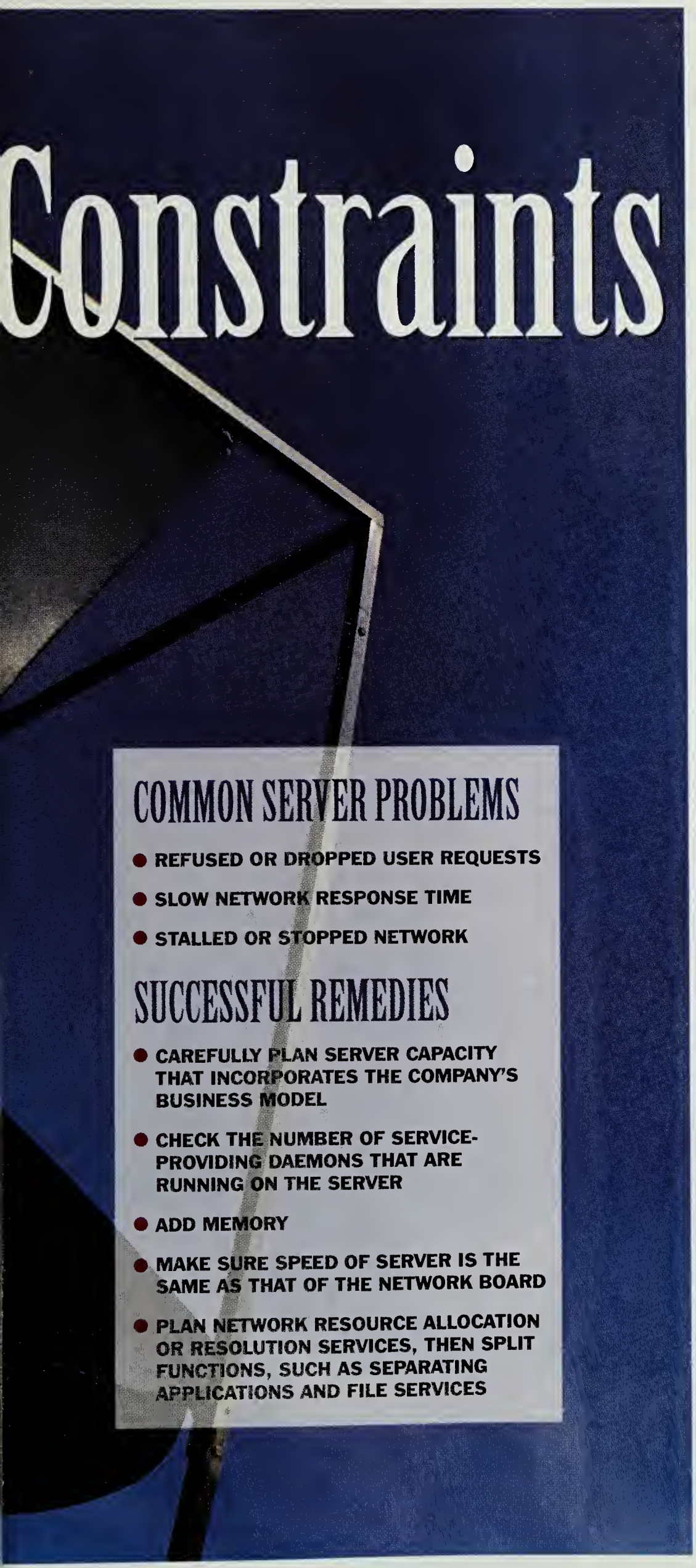
ILLUSTRATIONS BY ELLEN WEINSTEIN

Heading Off Server

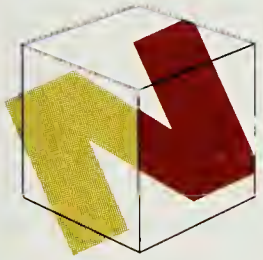


YOU CAN'T saturate network traffic, Ciba Geigy's Roger Holtom says

Constraints



PHOTOGRAPHY BY WILL MCINTYRE



Northwest Natural Gas Co. is finding life complicated compared with the old days — two years ago.

That was before the utility started to supplant 60% of its mainframe usage with networked servers. Slowly, in a careful, ongoing move to an open systems client/server environment, the company is migrating its massive Customer Information System to a melange of Sun Microsystems, Inc., Silicon Graphics, Inc. and Hewlett-Packard Co. workstation/servers.

Though happy with the transition, the company has found that multivendor client/server networks make it difficult at times to isolate server performance problems, said Jim Schaffer, manager of customer systems at Northwest.

Many information systems shops are finding that server retrieval efficiency has more to do with network and software tuning than with server hardware. Oftentimes, a company will think that it has a server hardware problem, when in reality, it's badly designed network architecture, according to Andy Rundquist, a systems design consultant who is part of a client/server implementation team at Northwest.

Ciba Geigy's Chemicals division in Greensboro, N.C., reached a similar conclusion. Success in its three-part client/server implementation slated for completion in January 1995 has more to do with networking, software and training than with the Sun server architecture, said Roger Holtom, a business technology consultant at the division.

"Training is the most important piece. Without that you're dead. You have no hope of going on," he said, pointing to some 200 division employees who needed to be trained to use the Sun systems.

The Sun servers have so far performed with minimal difficulties in processing financial data that was previously handled on a mainframe. Problems did arise, however, as servers were enhanced to simultaneously connect to both Token Ring and Ethernet ▶

BY CHERYL GERBER

Continued from page 93

networks. "We had several incidents when we put a new machine on one of the Token Ring networks and the speed was incorrectly set on the network board, so it created an error that disrupted network traffic," Holtom said.

The problem was resolved by installing the Optivity network management product from SynOptics Communications, Inc. Optivity sends an error alert message on-screen that indicates which server needs attention.

Holtom said the team also learned not to saturate network traffic. "You can prevent that by subdividing your traffic into multiple Ethernet or Token Ring segments. Instead of putting 200 people on one Token Ring network, for example, it may be better to have 100 people on two Token Ring networks," he said.

Assured that the network problems have been resolved, Ciba Geigy is expanding the environment to include manufacturing order processing and human resource systems running SAP America, Inc.'s R/3 integrated manufacturing software.

On-line transaction processing (OLTP) applications, which create the most network traffic in server groups, is one particular problematic area in client/server computing. That's because vendors configure their operating systems with too few "daemons" — systems software that manages the network — consultant Rundquist said. When there are too few daemons, each one gets extremely busy so application throughput declines precipitously.

"When there aren't enough daemons to manage all requests, you should check the number of daemons running and increase it to a ratio that makes sense for the number of clients you have," Rundquist explained.

Using Network File System (NFS) as an example, Rundquist advises five clients per NFS daemon, unless the system is running a high volume of machine-to-machine traffic, in which case the number of clients should be reduced.

SERVER SECRETS

Eric Sokol, director of information services at Northwest Natural Gas, looked at four primary areas when selecting servers:

- **THE STABILITY OF THE SUPPLIER AND ITS SUPPORT OF THE COMMERCIAL MARKET.**
- **FLOATING POINT AND INTEGER BENCHMARK TESTS.**
- **AVAILABILITY OF "SOFT" FEATURES SUCH AS SCALABILITY, UPGRADE PATH AND THIRD-PARTY SOFTWARE.**
- **MAINTENANCE COSTS FOR UP TO THREE YEARS.**

Another way to ensure or improve server retrieval performance is to plan name services. A logical name is a mapping maintained at the system level and transparent to the application. It allows system administrators to move applications or data from server to server or to add or subtract servers without decreasing server efficiency.

"You always want to go after a logical name so that anything can be moved from one server to another anytime." This allows users to move data or applications from overtaxed to underutilized servers, he noted.

n arm of the U.S. Department of Defense in Aurora, Colo., ensures server performance by making sure each network of servers is autonomous, said Rafat Shaheen, senior network administrator.

"That doesn't mean a lack of interconnectivity and sharing data back and forth. But there is no interdependency," said Shaheen, who works at the Office of Civilian Health and Medical Program for the Uniformed Services, which is known as OCHAMPUS.

In fact, IS staffers building an infrastructure of Sun servers say current server architecture sometimes exceeds their expectations.

"There's a black magic number for subnetworks not to have more than 16 nodes, but we actually have some servers serving 20 nodes, and they're working great," Shaheen said. "We have not had our servers overloaded yet."

One of the best examples of dependency on server efficiency may be at US West's New Vector Group in Bellevue, Wash. The organization installed several Sequent Computer Systems Corp. 2000 Model 750 servers — the largest machine Sequent makes — running Oracle Corp.'s Oracle 7 with Sun workstations and PC clients.

Linked nationwide to US West's retail stores, the cellular telephone business group depends daily on the servers to provide users with real-time access to the database in an OLTP environment. Users add customer records and actually turn on a customer's cellular phone while the person is in the retail store.

"We check their credit record and activate their cellular phone on this system," said Clay Jackson, a data analyst in the group.

The cellular group conducted as much fault detection and diagnosis as it could before deploying mission-critical applications in the client/server environment. With database, operating system and network monitoring tools, the organization specified the maximum number of client processes the database could handle before it would start turning away requests.

"We configured our monitoring tool so it tracks the number of client processes and lets us know when we have gotten to within 85% of that limit," Jackson said.

One of the biggest problems US West had is when users would request hefty queries or reports of all cellular phone activations in a particular location.

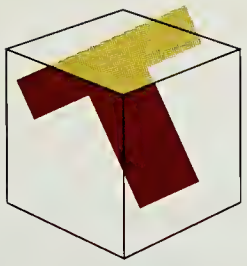
"If you ask that of a server doing heavy, real-time OLTP work, you run

into resource contention problems. Your database response time gets slow so you get customers waiting in the store for an activated phone or waiting to get a work order printed," Jackson said.

To prevent this from recurring, the group selected reports to be run and printed during off hours and educated users so they know which tasks have a heavy impact on the system.

To increase server efficiency, US West built Unix shell scripts (operating system programs) that take an input file on a master server and copy it to 10 target machines. It developed another tool for managing the Basic Operations System cellular network, then adapted that tool to manage its Oracle database environment. This let the group track events on multiple machines on a single display.

"If a connection goes down between a client and a server, we see it before it has an opportunity to create a problem," Jackson said.



o ensure top server performance, users also need to understand the nature of their application. For example, when using a server for OLTP, each transaction tends to be short and scattered across disks, so short response times are desirable. With decision support, users wander through lots of data.

The network becomes less important in the case of decision support because fewer people ask questions of data than put data in.

Also, with decision support, users must consider bandwidth to the disk. If there is a gigabyte of data on a disk, it can probably deliver the data at about only 3M byte/sec. If it is necessary to go through the entire gigabyte of data to get 3M bytes, then it is a systems software issue, said Bill Madill, Sequent's manager of enterprise IS marketing.

Adding symmetric multiprocessing (SMP) servers is one approach users are investigating to speed data access. With current SMP architecture, a number of CPUs have shared memory, and there is only one copy of the operating system. This requires more memory and poses the potential problem of bottlenecks.

In the future, SMP servers will grow to accommodate faster, higher-capacity disks — going from 3M to 6M byte/sec. — and larger-size memory capacity — from 1G or 2G to 4G bytes.

Such technology advances will eventually bring servers up to par with minicomputers, whose architectures were built to quickly sort data, said George Weiss, vice president of midrange computing at Gartner Group, Inc. in Stamford, Conn. ◩

Gerber is a San Francisco-based freelance writer specializing in information technology.

CA's Unicenter

Bridging the systems management gap with mixed results

PROS / CONS

The Client/Server Journal's New Product Review is an evaluation based on interviews with major users at corporate and educational installations. The product under review is being used in a production environment.

+ Unicenter enabled some users to move "data center-level" systems management to a Unix server environment, providing mission-critical security, storage and production management.

− Slow performance in security, poor technical support and weak performance management were concerns for users who reviewed the product. CA has committed to address these issues.

RATINGS

UNICENTER

Ratings are based on user expectations on a 1–to–5 scale, where 1 is below expectations and 5 is above expectations. Ratings are listed in order of importance to users.

OVERALL RATING	3
EASE OF USE	4
EASE OF INSTALLATION	3
RELIABILITY	4
PERFORMANCE	3
SECURITY	4
TECHNICAL SUPPORT	2
COST	3
VALUE	3
MULTIPLATFORM SUPPORT	4
PRODUCTION CONTROL	3
STORAGE MANAGEMENT	3
PERFORMANCE MANAGEMENT	2

To find a comprehensive security and administration package for your multiplatform client/server environment, you'll have to compromise. In the case of Computer Associates International, Inc.'s CA-Unicenter, users must trade off between a central repository for all security and systems management data and the superior functionality of point products from other vendors in areas such as performance management.

That is the consensus of users who participated in *Computerworld Client/Server Journal*'s product review of CA-Unicenter. The users chose CA-Unicenter for its consistent "look and feel" across the various system management functions and its ability to mirror many of the mainframe capabilities they were familiar with. They also liked dealing with a single vendor for all their system management requirements.

EASE OF USE

Compared with standard Unix tools, CA-Unicenter was easier to use, users said. The tool's graphical user interface (GUI) provides simplicity. In tasks such as scheduling and batch production, the interface makes it much easier, they said.

Education: "There's increased functionality in the product that causes some subtle complexities that make it a little less easy than simpler tools."

Petroleum: "Compared to other GUI-type products, Unicenter is very comparable. The tape component works differently than the other functions. CA explained it was written by a different group and will be better integrated over time."

EASE OF INSTALLATION

Users found the installation straightforward. Some nonstandard hardware configurations caused reinstallation, but otherwise things went smoothly.

Education: "It's much improved over the early installation procedures in beta versions. But it doesn't use HP's standard update or install format. It also has several postinstallation procedures."

Petroleum: "Compared to an MVS install, it's very easy. But compared to some other Unix installs, it's just in the middle."

RELIABILITY

Overall, the users had minor reliability problems that needed to be addressed with CA.

EVALUATORS

SITE PROFILES

Installation descriptions for users who evaluated Unicenter	UNIVERSITY	PETROLEUM	FINANCIAL	CONSUMER
PLATFORM	HP SERVER	HP SERVER	HP SERVER	HP SERVER
NUMBER OF USERS	60	FEWER THAN 10	20	30
TIME IN USE	4 MONTHS	14 MONTHS	6 MONTHS	6 MONTHS
REASON FOR PURCHASE	REPLACE UNIX TOOLS	REPLACE MAINFRAME	REPLACE MAINFRAME	REPLACE UNIX TOOLS

Education: "It has improved a great deal over the early versions. In general, we had a rocky time with defining a large number of users [up to 500] for security features. They worked with us quite a bit, and it has shaken out. Today it's feeling quite solid."

Petroleum: "Not many serious problems [have arisen], but we've had a lot of minor problems. It comes up and stays up."

PERFORMANCE

Users found performance problems in the security module but were otherwise satisfied.

Education: "There aren't any comparable rule-based security products. But we had to model our security to make it perform better. Backup has an entire database behind it, and it's slower than standard tools. You get an advantage with on-line versioning for your files, but there's a performance cost during backup."

Petroleum: "I'm a little disappointed in security. Signons are pretty slow, and the commit process takes longer than we'd like."

SECURITY

Users appreciated the security functionality but struggled with bugs and performance issues.

Education: "We like the flexibility of rule-based security vs. attribute-based security. It allows for a great diversity of applications."

Petroleum: "The diversity is good, but I've had a fair number of bugs in this area. If there's one area I don't want to see bugs [in], it's security."

TECHNICAL SUPPORT

The documentation was less than what users expected in terms of depth, and it was short on examples. Support varied based on whether the site was a beta user. Beta users received close assistance from the product's developers.

Education: "We were early beta, so at one point we had the original developers on-site. Phone support has been good. Beta testing has helped us get special treatment and faster response."

Petroleum: "There's been a lot of bugs, so I've been working with support a whole lot. They try hard, but it takes a long time to resolve issues."

COST

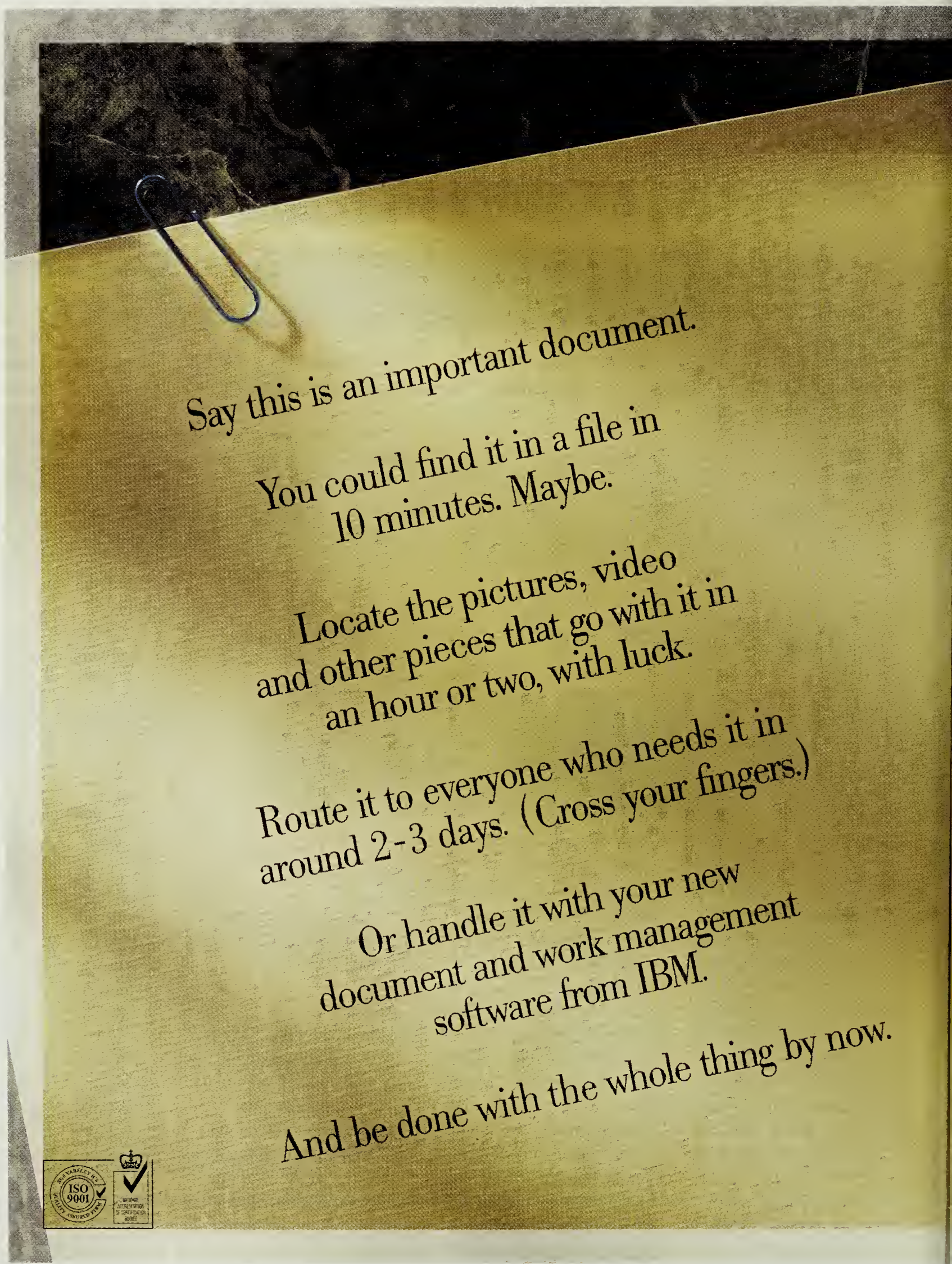
CA offers two pricing options for CA-Unicenter. One is based on the number of users on a network. The other is a new policy called Enterprise Pricing. Announced in November 1992, this option assigns units of power based on total networked machine capacity. The power units are based on Transaction Processing Performance Council benchmarks for the hardware platform.

Petroleum: "It's a reasonable cost, considering what it replaces."

VALUE

Users measured the value

Please turn to page 100



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Continued from page 97
of CA-Unicenter against the mainframe environment or Unix with standard systems management tools and found it to be worthwhile.

Education: "Compared to a bare-bones Unix box, it's great. We couldn't have sold our administrative people on downsizing without Unicenter."

MULTIPLATFORM SUPPORT

Because they were working in Hewlett-Packard Co. HP/UX environments, the users were unable to test multiple platform features. However, some had concerns about CA-Unicenter's use of Network File System (NFS) for storage and security, which would limit its ability to interoperate with non-NFS systems.

PRODUCTION CONTROL

Users reported that maintenance functions could be easier and that the spooler management doesn't add much functionality to the Unix spooler. But they liked the work-load management module's ability to set up asynchronous production and provide automated resolution of simple problems. Console management was also said to effectively centralize production information.

Education: "In MVS, we developed our own production control system. This product mapped almost identically to that environment. That was very attractive — to see it as a simple conversion to Unix."

Petroleum: "Our mainframe tools — the report dispatch and job scheduler in particular — are superior to what Unicenter does. We're trying to emulate the idea of [Job Entry Scheduler] in Unix — the submission of ad hoc jobs. The idea of job queues with first in, first out operation just isn't part of this product.

STORAGE MANAGEMENT

Compared with Unix storage, the storage management module performed well, the users said, but it lacked the functionality of the mainframe environment.

Education: "The on-line archival information Unicenter provides makes it very much better than manual approaches and basic Unix features."

Petroleum: "Backup keeps track of versions, but archival features can alter the backup scheme. Backup cycles are also hard to duplicate from the mainframe environment."

PERFORMANCE MANAGEMENT

Users said this module was a front end to Unix features but that it had no added functionality.

Petroleum: "There's no gain in this area. Compared to HP's Glance [performance management] product, Unicenter has less to offer." ◩

Written by Michael L. Sullivan-Trainor, Computerworld*'s senior editor, CW Guide.*

FEATURES

UNICENTER

- **Allows mainframelike systems management features to be transferred to Unix servers. Initially released for Hewlett-Packard's systems but planned for most major Unix platforms.**
- **Provides the following features: security, control, audit, automated storage management, production control, performance management and accounting and data center administration.**
- **The first comprehensive tool of its kind for client/server environments, Unicenter will increase in functionality and portability over time. The product benefits from CA's experience with mainframe installations.**

COMPUTER ASSOCIATES RESPONDS

TRADE-OFF IN PRODUCT FUNCTIONALITY: We brought Unicenter to the market jointly with HP. We put capabilities in Unicenter for platforms that didn't have performance tools. But we also put in interoperability so the capabilities of HP's tools interoperate with those of Unicenter.

Unicenter was completely engineered to work with third-party tools such as Candle Corp.'s Availability Command Center.

No one has the security capabilities or the tape protection capabilities that Unicenter has. No one can claim to because that's what the development partnerships with the hardware vendors gave us.

COMPARISON TO MAINFRAME TOOLS: We found the core set of capabilities that you need to schedule a job and do report distribution, and we decided to bring that set of functionality to market. We knew we would get a whole bunch of other features people wanted.

PERFORMANCE IN SECURITY FUNCTIONS: Some HP/UX users had problems under specific circumstances because of a bug in Release 1.0. We corrected the bug, which doesn't exist in any other Unicenter-supported Unix platform.

TECHNICAL SUPPORT: The developers in the beta process have the ability to implement fixes immediately because they can correct anything that may occur as a result of the fix. But as soon as you go through General Availability, you have an obligation to go into phased releases in which the fix is tested out against all the other parts of the product before it's sent out. If it's a bug, we'll send out patches.

USE OF NFS FOR SECURITY: Security does not require NFS, although you can put a security file on NFS as with any other Unix file. We offer a security agent within Unicenter that lets you run policy security across multiple machines without NFS.

NEXT RELEASES: The beta release of Version 1.1 will be out this month, and general availability will be 60 days after. Version 2.0 will beta-test in the fourth quarter.

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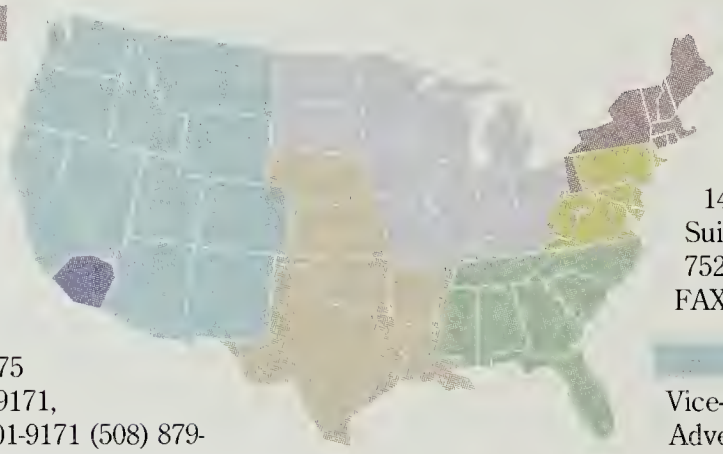

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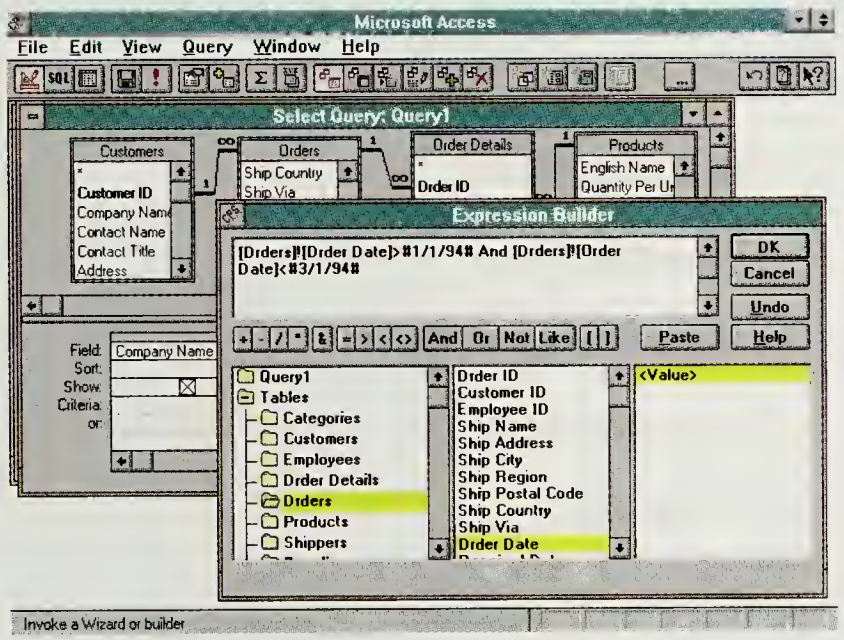
Microsoft's Access 2.0

If you're a diehard user of Microsoft Corp.'s application software, run right down to the store and grab a copy of Access 2.0.

The database now includes many of the usability features that have been added to the Excel 5.0 spreadsheet and Word 6.0 word processor in the last six months. Included in the revamped Access interface are embellishments such as ToolTips and shortcut menus. Usability is further enhanced with a series of helpful Builders for creating and changing macros, queries and menu bars.



Developers will be sated with beefier programming controls and features. For example, form and report properties can be set during runtime. Access Basic has been enhanced to provide a broader range of control over Access 2.0 components.

Though SQL functionality has been adequately enhanced in Access 2.0, most users will find more utility in the additions to its table and query facilities.

But users will bemoan some of these changes. The suggested Windows memory doubles from 4M to 8M bytes. The plethora of new Wizards is of dubious benefit because it raises questions about Access' ease of use.

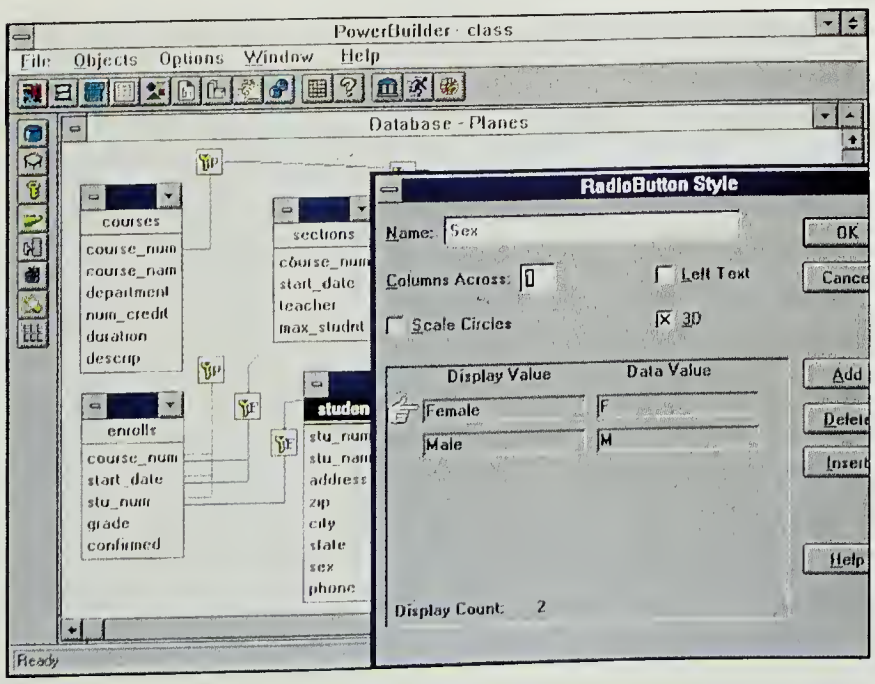
Finally, Visual Basic programmers and others writing Access applications will want to buy the Access Developer's Toolkit, a $495 suite.

Pricing: $99 upgrade from Version 1.x for 90 days; $495 retail; $129 competitive upgrade. Microsoft (206) 882-8080. ◩

Powersoft's PowerBuilder Desktop

Powersoft Corp. has recently shown no shortage of inventiveness in debundling, repackaging and enhancing its PowerBuilder line.

Since late last year, the company has upscaled its original client/server development tool to an industrial-strength tool kit, PowerBuilder Enterprise. The $3,395 client/server arsenal includes the full array of Powersoft tools.



Now the development environment has been repackaged as a $695 standalone tool called PowerBuilder Desktop.

Actually, Desktop is not quite stand-alone. Though it does not have the database support of PowerBuilder Enterprise, it includes the underlying development and debugging tools, the PowerScript programming language, the same report and query painters and the same essential architecture and programming model.

For those who desire to start small and grow into client/server programming, Desktop provides a full upgrade path to the more robust Enterprise environment.

For anyone wanting to improve client/server programming skills or for companies with programmer trainees or evaluators, PowerBuilder Desktop is an economical way to get started, with an introductory price of $249 until May 31. Powersoft (617) 229-2200. ◩

Reviews by Garry N. Ray, Computerworld's senior editor, Firing Line. His Internet address is gray@cw.com.

Back to the Future?

So you've finally decided to implement a client/server system. You tell your IS team that it's time to define a client/server architecture, to select a series of middleware, client-side development systems and an RDBMS. You start sifting through mounds of vendor literature and holding meetings with your brain trust.

Your head starts to spin from the complexity of it all. Welcome to the wonderful world of client/server computing.

Today, this complex integration task is about the only option available to IS managers wanting to move from a host-centric computing environment to client/server. It is, therefore, not surprising that systems integrators are offering assistance.

However, I expect systems integrators to get some competition from vendors that package software into turnkey client/server systems. These systems will enhance the ability of organizations to begin replacing their aging infrastructures with client/server.

I expect that traditional systems vendors will be the first to step up to the challenge. These vendors, such as IBM, Digital, AT&T and HP, will begin to package their hardware with systems software and a communications infrastructure for distributed computing. They will also offer a selection of DBMSs and middleware and a variety of gateways, server-based repositories and client-side graphical development tools. The vendors will tie these components neatly together to provide users with a total solution.

This transition from a chaotic, build-your-own industry to an orchestrated, established systems market will give great impetus to the client/server movement.

Is there anything for IS managers to fear in this transition? Yes. It is important that users understand how to prepare for turnkey client/server and what to avoid. The downside is not apparent in the beginning or even in the first years after a turnkey system has been implemented. The problems will become apparent after a system is well-established.

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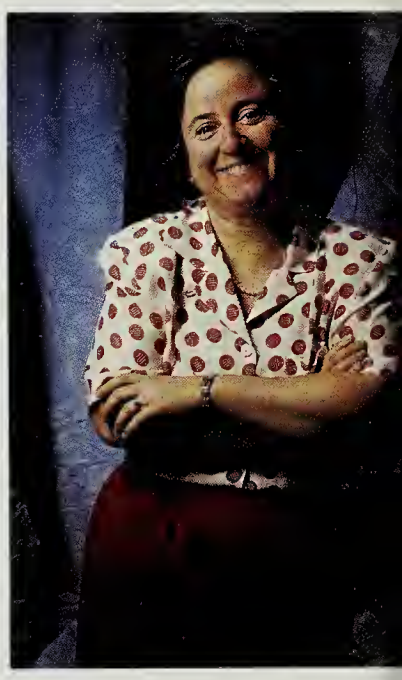
If the vendor has integrated the components too tightly, it may be difficult to replace one component of an architecture when a better component is introduced.

Once this happens, IS must either bring that vendor back into the picture or hire integrators to de-integrate the system so that a new component can be added. In any case, it may become a nightmare — not unlike what organizations have experienced when they've tried to change components in a minicomputer or mainframe system.

The irony is that even though such a system would consist of client/server technology, it would have the same characteristics as a traditional host system.

Now, I am not bad-mouthing turnkey client/server. However, it can be implemented poorly. So here are some guidelines:

- The implementation should have a modular design so that while components are intended to work together seamlessly, components can also be decoupled from the whole. Each interface between components should be documented. The development organization should have the source code for these interfaces so that if changes are required, a user does not have to depend on a vendor for help.
- If a vendor tries to sell a client/server turnkey system that offers no options, something is wrong. Organizations must be given some choice of components or the system may be too rigid to support change. And since change is the primary motivation for implementing client/server, flexibility is priority No. 1 for the brave new world of turnkey client/server computing. ◩



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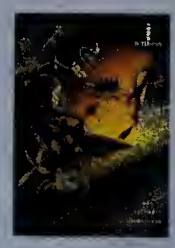

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